

SEQUENCE LISTING

<110> Jon S. THORSON

<120> MICROMONOSPORA ECHINOSPORA GENES
ENCODING FOR BIOSYNTHESIS OF
CALICHEAMICIN AND SELF-RESISTANCE THERETO

<130> 2653-26

<140> 09/457,045

<141> 1999-12-07

<150> 60/111,325

<151> 1998-12-07

<160> 95

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 546

<212> DNA

<213> Bacteria

<220>

<221> CDS

<222> (1) ... (546)

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Ser Thr Ala Ala Lys Lys Pro Lys Pro Pro Asn Tyr Asp Pro Phe Val	
20 25 30	
cgg cac agc gtc act gtc aag gcc gac cgc aag acc gcc ttc aag acg	144
Arg His Ser Val Thr Val Lys Ala Asp Arg Lys Thr Ala Phe Lys Thr	
35 40 45	
ttc ctc gaa ggc ttt ccg gag tgg tgg ccg aac aac ttc cgc acc acc	192
Phe Leu Glu Gly Phe Pro Glu Trp Trp Pro Asn Asn Phe Arg Thr Thr	
50 55 60	
aag gtc ggg gcc ccg ctg ggc gtc gac aag aag ggc ggc cgc tgg tac	240
Lys Val Gly Ala Pro Leu Gly Val Asp Lys Lys Gly Gly Arg Trp Tyr	
65 70 75 80	
gag atc gac gag cag ggc gag gag cac acc ttc ggc ctg atc cgg aag	288
Glu Ile Asp Glu Gln Gly Glu Glu His Thr Phe Gly Leu Ile Arg Lys	
85 90 95	

gtg gac gag ccg gac acg ctg gtc atc ggc tgg cgg ctc aac ggc ttc 336
Val Asp Glu Pro Asp Thr Leu Val Ile Gly Trp Arg Leu Asn Gly Phe
100 105 110

ggc cgg atc gac ccg gac aac tcg agc gag ttc acc gtg acc ttc gtg 384
Gly Arg Ile Asp Pro Asp Asn Ser Ser Glu Phe Thr Val Thr Phe Val
115 120 125

gcc gac ggc cag aag aag acc cgg gtg gac gtc gag cac acc cac ttc 432
Ala Asp Gly Gln Lys Lys Thr Arg Val Asp Val Glu His Thr His Phe
130 135 140

gac cgg atg ggc acc aag cac gcc aag cgg gtc cgc aac ggc atg gac 480
Asp Arg Met Gly Thr Lys His Ala Lys Arg Val Arg Asn Gly Met Asp
145 150 155 160

aag ggc tgg ccg acg atc ctc cag tcg ttc cag gac aag atc gac gag 528
Lys Gly Trp Pro Thr Ile Leu Gln Ser Phe Gln Asp Lys Ile Asp Glu
165 170 175

gaa ggg gcg aag aag tga 546
Glu Gly Ala Lys Lys *
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<212> PRT
<213> Bacteria

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35 40 45
Phe Leu Glu Gly Phe Pro Glu Trp Trp Pro Asn Asn Phe Arg Thr Thr
50 55 60
Lys Val Gly Ala Pro Leu Gly Val Asp Lys Lys Gly Gly Arg Trp Tyr
65 70 75 80
Glu Ile Asp Glu Gln Gly Glu Glu His Thr Phe Gly Leu Ile Arg Lys
85 90 95
Val Asp Glu Pro Asp Thr Leu Val Ile Gly Trp Arg Leu Asn Gly Phe
100 105 110
Gly Arg Ile Asp Pro Asp Asn Ser Ser Glu Phe Thr Val Thr Phe Val
115 120 125
Ala Asp Gly Gln Lys Lys Thr Arg Val Asp Val Glu His Thr His Phe
130 135 140
Asp Arg Met Gly Thr Lys His Ala Lys Arg Val Arg Asn Gly Met Asp
145 150 155 160
Lys Gly Trp Pro Thr Ile Leu Gln Ser Phe Gln Asp Lys Ile Asp Glu
165 170 175
Glu Gly Ala Lys Lys
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<210> 3

<211> 1155
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(1155)

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atg tct ccg gac gtc agc acc cgc gtc tcc gcc gtc ctg agc agt ggc 96
Met Ser Pro Asp Val Ser Thr Arg Val Ser Ala Val Leu Ser Ser Gly
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cgg ctg gag cac ggg ccg acc gtc gcc gag tac gag gcg gcc gtg ggc 144
Arg Leu Glu His Gly Pro Thr Val Ala Glu Tyr Glu Ala Ala Val Gly
             35             40             45

agt cgt atc ggc aac ccc cgg gtg gtc tcg gtc aac tgc ggc acg gcc 192
Ser Arg Ile Gly Asn Pro Arg Val Val Ser Val Asn Cys Gly Thr Ala
             50             55             60

ggg ctc cac ctg gcg ctg agc ctc gcc gcg cgg ccg ggg gcc ggc gag 240
Gly Leu His Leu Ala Leu Ser Leu Ala Ala Arg Pro Gly Ala Gly Glu
             65             70             75             80

tcg gag cac gac ggc ccg ggc gag gtg ctc acc acg ccg ctg acc ttc 288
Ser Glu His Asp Gly Pro Gly Glu Val Leu Thr Thr Pro Leu Thr Phe
             85             90             95

gag ggc acg aac tgg ccg atc ctc gcc aac ggg ctg cgc atc cgg tgg 336
Glu Gly Thr Asn Trp Pro Ile Leu Ala Asn Gly Leu Arg Ile Arg Trp
             100             105             110

gtg gac gtc gac ccg gcc acc ctc aac atg gac ctc gac gac ctg gcc 384
Val Asp Val Asp Pro Ala Thr Leu Asn Met Asp Leu Asp Asp Leu Ala
             115             120             125

gcg aag atc tcg ccc gcc acc cgg gcc atc gtg gtg gtc cac tgg ctc 432
Ala Lys Ile Ser Pro Ala Thr Arg Ala Ile Val Val Val His Trp Leu
             130             135             140

ggc tac ccg gtg gac ctc aac cgg ctg cgc gcc gtc gtg gac cgg gcc 480
Gly Tyr Pro Val Asp Leu Asn Arg Leu Arg Ala Val Val Asp Arg Ala
             145             150             155             160

acg gcg gga tac gac cgc cgc ccg ctg gtc gtg gag gac tgc gcg cag 528
Thr Ala Gly Tyr Asp Arg Arg Pro Leu Val Val Glu Asp Cys Ala Gln
             165             170             175

gcg tgg ggc gcc acc tac cgg ggc gcg ccg ctg ggc acg cac ggc aac 576
Ala Trp Gly Ala Thr Tyr Arg Gly Ala Pro Leu Gly Thr His Gly Asn
             180             185             190

gtc tgc gtg tac agc acc ggc gcg atc aag atc ctg acg acc ggc agc 624

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Val	Cys	Val	Tyr	Ser	Thr	Gly	Ala	Ile	Lys	Ile	Leu	Thr	Thr	Gly	Ser	
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ggc	ggc	ttc	gtc	gtg	ctg	ccc	gac	gac	gac	ctg	tac	gac	cgg	ctc	cgg	672
Gly	Gly	Phe	Val	Val	Leu	Pro	Asp	Asp	Asp	Leu	Tyr	Asp	Arg	Leu	Arg	
210						215					220					
ctg	cgc	cgc	tgg	ctc	ggc	atc	gag	cgg	gcg	tcg	gac	cgg	atc	acc	ggc	720
Leu	Arg	Arg	Trp	Leu	Gly	Ile	Glu	Arg	Ala	Ser	Asp	Arg	Ile	Thr	Gly	
225					230					235					240	
gac	tac	gac	gtc	gcc	gag	tgg	ggc	tac	cgg	ttc	atc	ctc	aac	gag	atc	768
Asp	Tyr	Asp	Val	Ala	Glu	Trp	Gly	Tyr	Arg	Phe	Ile	Leu	Asn	Glu	Ile	
				245					250					255		
ggc	ggg	gcg	atc	ggc	ctg	tcc	aac	ctg	gaa	cgc	gtc	gac	gag	ctg	ctg	816
Gly	Gly	Ala	Ile	Gly	Leu	Ser	Asn	Leu	Glu	Arg	Val	Asp	Glu	Leu	Leu	
			260					265					270			
cgc	cgg	cac	cgg	gag	aac	gcc	gcg	ttc	tac	gac	aag	gaa	ctg	gcc	ggc	864
Arg	Arg	His	Arg	Glu	Asn	Ala	Ala	Phe	Tyr	Asp	Lys	Glu	Leu	Ala	Gly	
		275					280					285				
atc	gac	ggc	gtc	gag	cag	acc	gag	cgg	gcc	gac	gac	cgg	gag	ccc	gcg	912
Ile	Asp	Gly	Val	Glu	Gln	Thr	Glu	Arg	Ala	Asp	Asp	Arg	Glu	Pro	Ala	
	290					295					300					
ttc	tgg	atg	tac	ccg	ctg	aag	gtc	cgc	gac	cgt	ccc	gcc	ttc	atg	cgc	960
Phe	Trp	Met	Tyr	Pro	Leu	Lys	Val	Arg	Asp	Arg	Pro	Ala	Phe	Met	Arg	
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cgg	ctg	ctc	gac	gcc	ggc	atc	gcc	acc	agc	gtc	gtg	tcg	cgc	cgc	aac	1008
Arg	Leu	Leu	Asp	Ala	Gly	Ile	Ala	Thr	Ser	Val	Val	Ser	Arg	Arg	Asn	
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gac	gcg	cac	agc	tgc	gtc	gcg	tcg	gcc	cgc	acc	acc	ctg	ccc	ggg	ctg	1056
Asp	Ala	His	Ser	Cys	Val	Ala	Ser	Ala	Arg	Thr	Thr	Leu	Pro	Gly	Leu	
			340					345					350			
gac	cgg	gtg	gcg	gac	cgc	gtg	gtc	cac	atc	ccg	gtg	ggc	tgg	tgg	ctc	1104
Asp	Arg	Val	Ala	Asp	Arg	Val	Val	His	Ile	Pro	Val	Gly	Trp	Trp	Leu	
		355					360					365				
acc	gag	gac	gac	cgc	tcc	cac	gtc	gtc	gaa	acg	atc	aag	tcc	ggc	tgg	1152
Thr	Glu	Asp	Asp	Arg	Ser	His	Val	Val	Glu	Thr	Ile	Lys	Ser	Gly	Trp	
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tga																1155
*																

<210> 4
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 <212> PRT
 <213> Bacteria

<400> 4

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Arg	Leu	Glu	His	Gly	Pro	Thr	Val	Ala	Glu	Tyr	Glu	Ala	Ala	Val	Gly
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Ser	Arg	Ile	Gly	Asn	Pro	Arg	Val	Val	Ser	Val	Asn	Cys	Gly	Thr	Ala
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Gly	Leu	His	Leu	Ala	Leu	Ser	Leu	Ala	Ala	Arg	Pro	Gly	Ala	Gly	Glu
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Ser	Glu	His	Asp	Gly	Pro	Gly	Glu	Val	Leu	Thr	Thr	Pro	Leu	Thr	Phe
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Glu	Gly	Thr	Asn	Trp	Pro	Ile	Leu	Ala	Asn	Gly	Leu	Arg	Ile	Arg	Trp
			100					105					110		
Val	Asp	Val	Asp	Pro	Ala	Thr	Leu	Asn	Met	Asp	Leu	Asp	Asp	Leu	Ala
		115					120					125			
Ala	Lys	Ile	Ser	Pro	Ala	Thr	Arg	Ala	Ile	Val	Val	Val	His	Trp	Leu
	130					135						140			
Gly	Tyr	Pro	Val	Asp	Leu	Asn	Arg	Leu	Arg	Ala	Val	Val	Asp	Arg	Ala
145					150					155					160
Thr	Ala	Gly	Tyr	Asp	Arg	Arg	Pro	Leu	Val	Val	Glu	Asp	Cys	Ala	Gln
				165					170					175	
Ala	Trp	Gly	Ala	Thr	Tyr	Arg	Gly	Ala	Pro	Leu	Gly	Thr	His	Gly	Asn
			180					185						190	
Val	Cys	Val	Tyr	Ser	Thr	Gly	Ala	Ile	Lys	Ile	Leu	Thr	Thr	Gly	Ser
		195					200					205			
Gly	Gly	Phe	Val	Val	Leu	Pro	Asp	Asp	Asp	Leu	Tyr	Asp	Arg	Leu	Arg
	210					215					220				
Leu	Arg	Arg	Trp	Leu	Gly	Ile	Glu	Arg	Ala	Ser	Asp	Arg	Ile	Thr	Gly
225					230					235					240
Asp	Tyr	Asp	Val	Ala	Glu	Trp	Gly	Tyr	Arg	Phe	Ile	Leu	Asn	Glu	Ile
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Gly	Gly	Ala	Ile	Gly	Leu	Ser	Asn	Leu	Glu	Arg	Val	Asp	Glu	Leu	Leu
			260					265					270		
Arg	Arg	His	Arg	Glu	Asn	Ala	Ala	Phe	Tyr	Asp	Lys	Glu	Leu	Ala	Gly
		275					280					285			
Ile	Asp	Gly	Val	Glu	Gln	Thr	Glu	Arg	Ala	Asp	Asp	Arg	Glu	Pro	Ala
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Phe	Trp	Met	Tyr	Pro	Leu	Lys	Val	Arg	Asp	Arg	Pro	Ala	Phe	Met	Arg
305					310					315					320
Arg	Leu	Leu	Asp	Ala	Gly	Ile	Ala	Thr	Ser	Val	Val	Ser	Arg	Arg	Asn
			325						330					335	
Asp	Ala	His	Ser	Cys	Val	Ala	Ser	Ala	Arg	Thr	Thr	Leu	Pro	Gly	Leu
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Asp	Arg	Val	Ala	Asp	Arg	Val	Val	His	Ile	Pro	Val	Gly	Trp	Trp	Leu
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Thr	Glu	Asp	Asp	Arg	Ser	His	Val	Val	Glu	Thr	Ile	Lys	Ser	Gly	Trp
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<210> 5
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 <212> DNA
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<220>
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 <222> (1) ... (990)

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1. $\frac{1}{2} \log \frac{1}{2}$

[illegible]

biosynthetic gene

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Val Val Glu Arg Leu Val Arg Arg Gly Asp Glu Val Val Val Tyr Asp
20 25 30

ctc gcc gac ccg ccg ccc gac ctg gag cac ccg ccg ggc gcg atc cgg 144
Leu Ala Asp Pro Pro Pro Asp Leu Glu His Pro Pro Gly Ala Ile Arg
35 40 45

cac gtc cgc ggc gac gtc cgg gac gcc gac ggg ctg gcg gcc gcc gcc 192
His Val Arg Gly Asp Val Arg Asp Ala Asp Gly Leu Ala Ala Ala Ala
50 55 60

acc ggc gtg gac gag gtc tac cac ctc gcg gcg gtc gtc ggc gtc gac 240
Thr Gly Val Asp Glu Val Tyr His Leu Ala Ala Val Val Gly Val Asp
65 70 75 80

cgg tac ctc agc cgg ccg ctg gac gtg gtc gag atc aac gtg gac ggc 288
Arg Tyr Leu Ser Arg Pro Leu Asp Val Val Glu Ile Asn Val Asp Gly
85 90 95

acc cgg aac gcg ttg cgc gcc gca ctg cgc gcc ggt gcc cgg gtc gtg 336
Thr Arg Asn Ala Leu Arg Ala Ala Leu Arg Ala Gly Ala Arg Val Val
100 105 110

gtg tcc agc acc agc gag gtg tac ggg cgc aat ccg cgg gtg ccg tgg 384
Val Ser Ser Thr Ser Glu Val Tyr Gly Arg Asn Pro Arg Val Pro Trp

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115	120	125	
cgg gag gac gac gac Arg Glu Asp Asp Asp 130	cgg gtg ctc ggc agc Arg Val Leu Gly Ser 135	acg gcg acg gac cgg tgg Ala Thr Asp Arg Trp 140	432
tcg tac tcg acg agc Ser Tyr Ser Thr Ser 145	aag gcg gcg gcc gag Lys Ala Ala Ala Glu 150	cac ctg gcc ttc gcc ttc His Leu Ala Phe Ala Phe 155 160	480
cac cgg cag gag ggc His Arg Gln Glu Gly 165	ctg ccg gtg acg gtg Leu Pro Val Thr Val 170	ctg gcg tac ttc aac gtc Leu Arg Tyr Phe Asn Val 175	528
tac ggc cca cgc cag Tyr Gly Pro Arg Gln 180	cgc ccg gcg tac gtc Arg Pro Ala Tyr Val 185	ctc agc cgc acc gtc gcc Leu Ser Arg Thr Val Ala 190	576
cgc ctg ctg cgg ggc Arg Leu Leu Arg Gly 195	gtt ccg ccc gtg gtg Val Pro Pro Val Val 200	tac gac gac ggc cgc cag Tyr Asp Asp Gly Arg Gln 205	624
acg cgg tgc ttc acc Thr Arg Cys Phe Thr 210	tgg atc gac gag gcg Trp Ile Asp Glu Ala 215	gcc gag gcg acc ctg ctg Glu Ala Thr Leu Leu 220	672
gcc gcc gcc cac ccg Ala Ala Ala His Pro 225	cgg gcc gtc ggc gag Arg Ala Val Gly Glu 230	tgt ttc aac atc ggc agc Cys Phe Asn Ile Gly Ser 235 240	720
agc gtg gag acc acc Ser Val Glu Thr Thr 245	gtc gcc gag gcg gtc Val Ala Glu Ala Val 250	ccg ctg gcc ggc acg gtg Arg Leu Ala Gly Thr Val 255	768
gcc ggg gtg ccg gtg Ala Gly Val Pro Val 260	gcg gcc cag acc gcg Ala Ala Gln Thr Ala 265	gac acc gga gcc ggg ctc Asp Thr Gly Ala Gly Leu 270	816
ggc gcc cgc tac cag Gly Ala Arg Tyr Gln 275	gac att ccc cgc cgc Asp Ile Pro Arg Arg 280	gta ccg gac tgc ggc aag Val Pro Asp Cys Gly Lys 285	864
gcc gcc gcg ctg ctg Ala Ala Ala Leu Leu 290	gac tgg cgg gcc cgg Asp Trp Arg Ala Arg 295	gtg ccg ctg gtg acc ggc Val Pro Leu Val Thr Gly 300	912
ctg cgc cgg acc gtc Leu Arg Arg Thr Val 305	gag tgg gcc cgc cgc Glu Trp Ala Arg Arg 310	aac ccg tgg tgg acc gcc Asn Pro Trp Trp Thr Ala 315 320	960
cag gcc gac gac gga Gln Ala Asp Asp Gly 325	ctg gtc gtc agg tag Leu Val Val Arg *		990

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<211> 329
<212> PRT

<213> Bacteria

<400> 6

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Leu Ala Asp Pro Pro Pro Asp Leu Glu His Pro Pro Gly Ala Ile Arg
35 40 45
His Val Arg Gly Asp Val Arg Asp Ala Asp Gly Leu Ala Ala Ala Ala
50 55 60
Thr Gly Val Asp Glu Val Tyr His Leu Ala Ala Val Val Gly Val Asp
65 70 75 80
Arg Tyr Leu Ser Arg Pro Leu Asp Val Val Glu Ile Asn Val Asp Gly
85 90 95
Thr Arg Asn Ala Leu Arg Ala Ala Leu Arg Ala Gly Ala Arg Val Val
100 105 110
Val Ser Ser Thr Ser Glu Val Tyr Gly Arg Asn Pro Arg Val Pro Trp
115 120 125
Arg Glu Asp Asp Asp Arg Val Leu Gly Ser Thr Ala Thr Asp Arg Trp
130 135 140
Ser Tyr Ser Thr Ser Lys Ala Ala Ala Glu His Leu Ala Phe Ala Phe
145 150 155 160
His Arg Gln Glu Gly Leu Pro Val Thr Val Leu Arg Tyr Phe Asn Val
165 170 175
Tyr Gly Pro Arg Gln Arg Pro Ala Tyr Val Leu Ser Arg Thr Val Ala
180 185 190
Arg Leu Leu Arg Gly Val Pro Pro Val Val Tyr Asp Asp Gly Arg Gln
195 200 205
Thr Arg Cys Phe Thr Trp Ile Asp Glu Ala Ala Glu Ala Thr Leu Leu
210 215 220
Ala Ala Ala His Pro Arg Ala Val Gly Glu Cys Phe Asn Ile Gly Ser
225 230 235 240
Ser Val Glu Thr Thr Val Ala Glu Ala Val Arg Leu Ala Gly Thr Val
245 250 255
Ala Gly Val Pro Val Ala Ala Gln Thr Ala Asp Thr Gly Ala Gly Leu
260 265 270
Gly Ala Arg Tyr Gln Asp Ile Pro Arg Arg Val Pro Asp Cys Gly Lys
275 280 285
Ala Ala Ala Leu Leu Asp Trp Arg Ala Arg Val Pro Leu Val Thr Gly
290 295 300
Leu Arg Arg Thr Val Glu Trp Ala Arg Arg Asn Pro Trp Trp Thr Ala
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Gln Ala Asp Asp Gly Leu Val Val Arg
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<211> 987

<212> DNA

<213> Bacteria

<220>

<221> CDS

<222> (1)...(987)

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gtc	ttc	ggc	cag	acg	cgc	gcg	gtc	gac	gga	ctg	gac	ctg	gtg	gtg	cgg	96
Val	Phe	Gly	Gln	Thr	Arg	Ala	Val	Asp	Gly	Leu	Asp	Leu	Val	Val	Arg	
			20					25					30			
gcc	ggg	acg	atc	cac	ggg	gtg	ctg	ggc	ccg	aac	ggc	gcc	ggc	aag	acg	144
Ala	Gly	Thr	Ile	His	Gly	Val	Leu	Gly	Pro	Asn	Gly	Ala	Gly	Lys	Thr	
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acg	gcc	atc	aag	atg	ctc	gcc	acg	ctg	atg	cga	ccc	acc	tcc	ggc	acc	192
Thr	Ala	Ile	Lys	Met	Leu	Ala	Thr	Leu	Met	Arg	Pro	Thr	Ser	Gly	Thr	
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gcg	tcc	gtg	ctg	ggg	cac	gac	gtg	gtc	cgc	gag	gcc	gcc	gag	gtc	cgg	240
Ala	Ser	Val	Leu	Gly	His	Asp	Val	Val	Arg	Glu	Ala	Ala	Glu	Val	Arg	
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cgc	cgc	atc	ggc	ctc	acc	ggc	cag	acc	atg	tcc	gtc	gac	gag	gac	atg	288
Arg	Arg	Ile	Gly	Leu	Thr	Gly	Gln	Thr	Met	Ser	Val	Asp	Glu	Asp	Met	
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acc	ggc	gtg	cag	aac	ctg	atc	ctc	gcc	ggc	cgc	ctg	cag	ggg	ctg	cgg	336
Thr	Gly	Val	Gln	Asn	Leu	Ile	Leu	Ala	Gly	Arg	Leu	Gln	Gly	Leu	Arg	
			100					105					110			
cac	gcg	tcc	gcg	gcc	gcg	cgg	gcg	gag	cag	ttg	atg	gag	gcg	ttc	gac	384
His	Ala	Ser	Ala	Ala	Ala	Arg	Ala	Glu	Gln	Leu	Met	Glu	Ala	Phe	Asp	
			115				120					125				
ctc	acc	gag	gtc	ggc	ggc	cgg	ctg	gtg	aag	acc	ttc	tcc	ggc	ggg	cag	432
Leu	Thr	Glu	Val	Gly	Gly	Arg	Leu	Val	Lys	Thr	Phe	Ser	Gly	Gly	Gln	
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cgg	cgg	cgc	atc	gac	gtg	gcc	gcg	agc	atg	gtg	gtc	acc	ccc	gag	ctg	480
Arg	Arg	Arg	Ile	Asp	Val	Ala	Ala	Ser	Met	Val	Val	Thr	Pro	Glu	Leu	
			145			150				155				160		
ctg	ttc	ctc	gac	gag	ccg	acc	acc	ggc	ctc	gac	ccg	cgc	agc	cgc	agc	528
Leu	Phe	Leu	Asp	Glu	Pro	Thr	Thr	Gly	Leu	Asp	Pro	Arg	Ser	Arg	Ser	
				165				170					175			
gag	gtc	tgg	gag	atg	atc	cgg	gcg	ctg	gtc	cgg	gac	ggg	ggc	acc	gtc	576
Glu	Val	Trp	Glu	Met	Ile	Arg	Ala	Leu	Val	Arg	Asp	Gly	Gly	Thr	Val	
			180					185					190			
ctg	ctg	acc	acg	cag	tac	ctc	gac	gag	gcg	gac	cac	ctc	gcc	gac	gag	624
Leu	Leu	Thr	Thr	Gln	Tyr	Leu	Asp	Glu	Ala	Asp	His	Leu	Ala	Asp	Glu	
			195				200					205				
ctg	acg	ctc	atc	gac	cac	ggc	cgc	atc	gtg	gcg	cag	ggc	acc	ccg	ccg	672
Leu	Thr	Leu	Ile	Asp	His	Gly	Arg	Ile	Val	Ala	Gln	Gly	Thr	Pro	Pro	
			210			215					220					
gag	ctg	aag	gcg	agc	cgc	gcc	gcc	ggc	gtg	ctc	gac	gtg	cgg	ctg	cgt	720
Glu	Leu	Lys	Ala	Ser	Arg	Ala	Ala	Gly	Val	Leu	Asp	Val	Arg	Leu	Arg	
			225			230				235				240		

gac	ccc	gag	cgc	cgg	gcc	gac	gcg	ggc	gcc	ctg	ctc	gcc	aag	gcc	gtc	768
Asp	Pro	Glu	Arg	Arg	Ala	Asp	Ala	Gly	Ala	Leu	Leu	Ala	Lys	Ala	Val	
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ggc	gcc	gcc	gcc	gac	ctc	gac	tcc	gat	ccg	gcg	cgg	ctg	tcg	gtg	cgg	816
Gly	Ala	Ala	Ala	Asp	Leu	Asp	Ser	Asp	Pro	Ala	Arg	Leu	Ser	Val	Arg	
			260					265					270			
gtg	acc	gac	ccc	gac	cgg	gcg	gcg	ctg	gcc	ctg	ggc	gag	ctg	gcg	cgg	864
Val	Thr	Asp	Pro	Asp	Arg	Ala	Ala	Leu	Ala	Leu	Gly	Glu	Leu	Ala	Arg	
		275						280				285				
gcc	ggc	atc	cac	gtc	gac	gac	ttc	acg	ctc	ggc	cag	ccc	tcg	ctc	gac	912
Ala	Gly	Ile	His	Val	Asp	Asp	Phe	Thr	Leu	Gly	Gln	Pro	Ser	Leu	Asp	
	290						295				300					
acg	gtg	ttc	ctc	gcc	ctc	acc	ggc	cac	tcg	acg	gtc	gac	gcc	agc	gaa	960
Thr	Val	Phe	Leu	Ala	Leu	Thr	Gly	His	Ser	Thr	Val	Asp	Ala	Ser	Glu	
305					310					315					320	
gaa	gag	gaa	gca	gag	gta	cgg	gca	tga								987
Glu	Glu	Glu	Ala	Glu	Val	Arg	Ala	*								
				325												

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 <212> PRT
 <213> Bacteria

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Val	Phe	Gly	Gln	Thr	Arg	Ala	Val	Asp	Gly	Leu	Asp	Leu	Val	Val	Arg	
			20					25					30			
Ala	Gly	Thr	Ile	His	Gly	Val	Leu	Gly	Pro	Asn	Gly	Ala	Gly	Lys	Thr	
		35					40					45				
Thr	Ala	Ile	Lys	Met	Leu	Ala	Thr	Leu	Met	Arg	Pro	Thr	Ser	Gly	Thr	
	50				55					60						
Ala	Ser	Val	Leu	Gly	His	Asp	Val	Val	Arg	Glu	Ala	Ala	Glu	Val	Arg	
65				70					75						80	
Arg	Arg	Ile	Gly	Leu	Thr	Gly	Gln	Thr	Met	Ser	Val	Asp	Glu	Asp	Met	
			85					90					95			
Thr	Gly	Val	Gln	Asn	Leu	Ile	Leu	Ala	Gly	Arg	Leu	Gln	Gly	Leu	Arg	
			100				105						110			
His	Ala	Ser	Ala	Ala	Ala	Arg	Ala	Glu	Gln	Leu	Met	Glu	Ala	Phe	Asp	
		115					120					125				
Leu	Thr	Glu	Val	Gly	Gly	Arg	Leu	Val	Lys	Thr	Phe	Ser	Gly	Gly	Gln	
	130				135					140						
Arg	Arg	Arg	Ile	Asp	Val	Ala	Ala	Ser	Met	Val	Val	Thr	Pro	Glu	Leu	
145				150					155						160	
Leu	Phe	Leu	Asp	Glu	Pro	Thr	Thr	Gly	Leu	Asp	Pro	Arg	Ser	Arg	Ser	
			165					170					175			
Glu	Val	Trp	Glu	Met	Ile	Arg	Ala	Leu	Val	Arg	Asp	Gly	Gly	Thr	Val	
		180					185					190				
Leu	Leu	Thr	Thr	Gln	Tyr	Leu	Asp	Glu	Ala	Asp	His	Leu	Ala	Asp	Glu	
		195					200					205				

Leu Thr Leu Ile Asp His Gly Arg Ile Val Ala Gln Gly Thr Pro Pro
 210 215 220
 Glu Leu Lys Ala Ser Arg Ala Ala Gly Val Leu Asp Val Arg Leu Arg
 225 230 235 240
 Asp Pro Glu Arg Arg Ala Asp Ala Gly Ala Leu Leu Ala Lys Ala Val
 245 250 255
 Gly Ala Ala Ala Asp Leu Asp Ser Asp Pro Ala Arg Leu Ser Val Arg
 260 265 270
 Val Thr Asp Pro Asp Arg Ala Ala Leu Ala Leu Gly Glu Leu Ala Arg
 275 280 285
 Ala Gly Ile His Val Asp Asp Phe Thr Leu Gly Gln Pro Ser Leu Asp
 290 295 300
 Thr Val Phe Leu Ala Leu Thr Gly His Ser Thr Val Asp Ala Ser Glu
 305 310 315 320
 Glu Glu Glu Ala Glu Val Arg Ala
 325

<210> 9
 <211> 1686
 <212> DNA
 <213> Bacteria

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 <223> n = A,T,C or G

<221> misc_feature
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 <223> n = A,T,C or G

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 Met Thr Thr Pro Ser Thr Glu Val Arg Pro Leu Pro Ala Glu Ile Phe
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 agc cga tcg gtg gcc ggc gcg gaa cgg ccg cca cgc ccc ggc ccg ctg 96
 Ser Arg Ser Val Ala Gly Ala Glu Arg Pro Pro Arg Pro Gly Pro Leu
 20 25 30
 ttc gcc gtc cgc acc ttc gcc tgg cgg aac ctg atc aag ctc cgg tac 144
 Phe Ala Val Arg Thr Phe Ala Trp Arg Asn Leu Ile Lys Leu Arg Tyr
 35 40 45
 gtg cag gac cac ctg ggc acc gcg gtg gtc ttc ccg atc atc ctg acg 192
 Val Gln Asp His Leu Gly Thr Ala Val Val Phe Pro Ile Ile Leu Thr
 50 55 60
 ctg gtc ttc acc tat ctg ctc ggc ggc gcg atc gcc ggc tcg ccc cgg 240
 Leu Val Phe Thr Tyr Leu Leu Gly Gly Ala Ile Ala Gly Ser Pro Arg
 65 70 75 80
 gag tac ctg cag ttc ttc ctt ccc ggc gtg atc gtc ctc tcg ctc gtg 288
 Glu Tyr Leu Gln Phe Phe Leu Pro Gly Val Ile Val Leu Ser Leu Val

85										90										95										
tcg	tcg	agc	atg	atg	agc	gcc	ctg	acg	ctg	aac	cgg	gac	atc	gcc	acc	336														
Ser	Ser	Ser	Met	Met	Ser	Ala	Leu	Thr	Leu	Asn	Arg	Asp	Ile	Ala	Thr															
100					105					110																				
ggc	atg	ttc	gac	cgg	gtc	cgc	agc	acg	ccc	atc	tgg	cag	ccc	gcg	gta	384														
Gly	Met	Phe	Asp	Arg	Val	Arg	Ser	Thr	Pro	Ile	Trp	Gln	Pro	Ala	Val															
115					120					125																				
ctg	gtc	ggg	gcg	atg	gcc	ggc	gac	gcc	gtc	cgg	tac	gcc	ctg	acc	tcg	432														
Leu	Val	Gly	Ala	Met	Ala	Gly	Asp	Ala	Val	Arg	Tyr	Ala	Leu	Thr	Ser															
130					135					140																				
atc	gtg	ccg	ctg	tcg	ctc	ggc	ctg	ctg	ctc	ggc	ttc	cgg	ccg	gac	ggc	480														
Ile	Val	Pro	Leu	Ser	Leu	Gly	Leu	Leu	Leu	Gly	Phe	Arg	Pro	Asp	Gly															
145					150					155					160															
ggc	ctg	tcc	ggg	gtg	gtg	ctc	gcc	ctg	ctc	tac	ctg	cag	ctg	ttc	acc	528														
Gly	Leu	Ser	Gly	Val	Val	Leu	Ala	Leu	Leu	Tyr	Leu	Gln	Leu	Phe	Thr															
165					170					175																				
ttc	agc	gtc	gcc	tgg	ctg	tgg	atg	ctg	ttc	gcg	gtg	ctg	atc	ccg	cag	576														
Phe	Ser	Val	Ala	Trp	Leu	Trp	Met	Leu	Phe	Ala	Val	Leu	Ile	Pro	Gln															
180					185					190																				
ccg	acc	gcc	gcc	gcc	ggc	gtg	gtg	aac	ctc	ctg	cag	ttc	gtg	ctc	ctc	624														
Pro	Thr	Ala	Ala	Ala	Gly	Val	Val	Asn	Leu	Leu	Gln	Phe	Val	Leu	Leu															
195					200					205																				
ttc	ggc	agc	aac	atc	ctg	gcg	ccg	tcg	cag	acg	atg	ccg	ggc	tgg	ctg	672														
Phe	Gly	Ser	Asn	Ile	Leu	Ala	Pro	Ser	Gln	Thr	Met	Pro	Gly	Trp	Leu															
210					215					220																				
gag	gcg	gtg	gtc	aag	ttg	aac	ccc	gtc	acc	cac	gcc	gcg	acc	gcc	acc	720														
Glu	Ala	Val	Val	Lys	Leu	Asn	Pro	Val	Thr	His	Ala	Ala	Thr	Ala	Thr															
225					230					235					240															
cgc	ggg	ctg	ntg	cac	ggc	acg	gtg	acc	tcg	ggg	gag	atg	ggc	gcn	ggc	768														
Arg	Gly	Leu	Xaa	His	Gly	Thr	Val	Thr	Ser	Gly	Glu	Met	Gly	Ala	Gly															
245					250					255																				
ctg	ctg	acc	tgc	gcc	gtg	ctc	atc	gtg	gct	gct	cgc	ccc	gcc	cac	gat	816														
Leu	Leu	Thr	Cys	Ala	Val	Leu	Ile	Val	Ala	Ala	Arg	Pro	Ala	His	Asp															
260					265					270																				
ctg	gct	cta	cag	ccg	caa	gca	gcg	ctg	aca	ccc	ctc	ccc	gac	ggc	ccc	864														
Leu	Ala	Leu	Gln	Pro	Gln	Ala	Ala	Leu	Thr	Pro	Leu	Pro	Asp	Gly	Pro															
275					280					285																				
ggt	gtg	ccc	cct	gtt	ctc	ctc	gca	ggg	gca	ggc	ccg	ggg	ccg	tcg	cgg	912														
Gly	Val	Pro	Pro	Val	Leu	Leu	Ala	Gly	Ala	Gly	Pro	Gly	Pro	Ser	Arg															
290					295					300																				
cat	ccc	gcc	gcc	ggt	cgg	cgc	tgt	gcc	ccg	gcc	gca	ccc	gga	gcc	ttt	960														
His	Pro	Ala	Ala	Gly	Arg	Arg	Cys	Ala	Pro	Ala	Ala	Pro	Gly	Ala	Phe															
305					310					315					320															

gcc gcg ccg gcc acc gct gct gcg gcc gta acc gcc cgc tgt gtc ggt 1008
 Ala Ala Pro Ala Thr Ala Ala Ala Ala Val Thr Ala Arg Cys Val Gly
 325 330 335

cac cgg cgc cgt ggc ggc gca ccg tgt cgg ggc cgg ctg ccc act tgt 1056
 His Arg Arg Arg Gly Gly Ala Pro Cys Arg Gly Arg Leu Pro Thr Cys
 340 345 350

ggc cgc cgt gcg gtc ggc gga cgg acg gcg gcc ccg gac gga cat gag 1104
 Gly Arg Arg Ala Val Gly Gly Arg Thr Ala Ala Pro Asp Gly His Glu
 355 360 365

tcc gtc cgg ggc cgc gtc gtg gtc ggt cga gca gct ccc gac cgg cta 1152
 Ser Val Arg Gly Arg Val Val Val Gly Arg Ala Ala Pro Asp Arg Leu
 370 375 380

cga gcc gga gtg gac cag cgc ggc cca ggc ctc gcc gcg ctc ctg cga 1200
 Arg Ala Gly Val Asp Gln Arg Gly Pro Gly Leu Ala Ala Leu Leu Arg
 385 390 395 400

gat ccg cat cat ctc ggg gct cgg ctc gaa ctc ctc ggc cgc gtc ctc 1248
 Asp Pro His His Leu Gly Ala Arg Leu Glu Leu Leu Gly Arg Val Leu
 405 410 415

cgg gac cgg gcc gcc cgg cag gtc gcc ccg gat gaa cat acc gag gaa 1296
 Arg Asp Arg Ala Ala Arg Gln Val Ala Pro Asp Glu His Thr Glu Glu
 420 425 430

gtc gag cgc cat ctc cca gcc gac gcc gac ctc cac gag cat ctg ctc 1344
 Val Glu Arg His Leu Pro Ala Asp Ala Asp Leu His Glu His Leu Leu
 435 440 445

cga ggt cgt ggc gtg ctc cag ctc cag cag ggt gcc gtc gcc ctc ctc 1392
 Arg Gly Arg Gly Val Leu Gln Leu Gln Gln Gly Ala Val Ala Leu Leu
 450 455 460

gtc agc cgc agc tcc acc tcg ctg tcc ggc ttg ccc tcg tac acc cag 1440
 Val Ser Arg Ser Ser Thr Ser Leu Ser Gly Leu Pro Ser Tyr Thr Gln
 465 470 475 480

ctg atg gtg agc cgg cgc ggt ggc tcg cag cgc agg atg tcg ccg ctg 1488
 Leu Met Val Ser Arg Arg Gly Gly Ser Gln Arg Arg Met Ser Pro Leu
 485 490 495

gcg ttg ccc tgc agg gcg aag ttg cca ccc tcg cgg agg tcg ccc ttg 1536
 Ala Leu Pro Cys Arg Ala Lys Leu Pro Pro Ser Arg Arg Ser Pro Leu
 500 505 510

ggc tcg atg aac cag cgg ttg atg cgg ttc ggg tcg gtg cag gcg ctc 1584
 Gly Ser Met Asn Gln Arg Leu Met Arg Phe Gly Ser Val Gln Ala Leu
 515 520 525

cag acc tcg tcg acg ggc gcg tcg tac cgt tgc cgg atg atg atg ctg 1632
 Gln Thr Ser Ser Thr Gly Ala Ser Tyr Arg Cys Arg Met Met Met Leu
 530 535 540

cgg gcc tcg ccg gcc ggg atg gtg cgc cgg ccg agg gca cgc tcc gtc 1680
 Arg Ala Ser Pro Ala Gly Met Val Arg Arg Pro Arg Ala Arg Ser Val

545

550

555

560

gcc tga
Ala *

1686

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<221> VARIANT
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Phe Ala Val Arg Thr Phe Ala Trp Arg Asn Leu Ile Lys Leu Arg Tyr
35 40 45
Val Gln Asp His Leu Gly Thr Ala Val Val Phe Pro Ile Ile Leu Thr
50 55 60
Leu Val Phe Thr Tyr Leu Leu Gly Gly Ala Ile Ala Gly Ser Pro Arg
65 70 75 80
Glu Tyr Leu Gln Phe Phe Leu Pro Gly Val Ile Val Leu Ser Leu Val
85 90 95
Ser Ser Ser Met Met Ser Ala Leu Thr Leu Asn Arg Asp Ile Ala Thr
100 105 110
Gly Met Phe Asp Arg Val Arg Ser Thr Pro Ile Trp Gln Pro Ala Val
115 120 125
Leu Val Gly Ala Met Ala Gly Asp Ala Val Arg Tyr Ala Leu Thr Ser
130 135 140
Ile Val Pro Leu Ser Leu Gly Leu Leu Leu Gly Phe Arg Pro Asp Gly
145 150 155 160
Gly Leu Ser Gly Val Val Leu Ala Leu Leu Tyr Leu Gln Leu Phe Thr
165 170 175
Phe Ser Val Ala Trp Leu Trp Met Leu Phe Ala Val Leu Ile Pro Gln
180 185 190
Pro Thr Ala Ala Ala Gly Val Val Asn Leu Leu Gln Phe Val Leu Leu
195 200 205
Phe Gly Ser Asn Ile Leu Ala Pro Ser Gln Thr Met Pro Gly Trp Leu
210 215 220
Glu Ala Val Val Lys Leu Asn Pro Val Thr His Ala Ala Thr Ala Thr
225 230 235 240
Arg Gly Leu Xaa His Gly Thr Val Thr Ser Gly Glu Met Gly Ala Gly
245 250 255
Leu Leu Thr Cys Ala Val Leu Ile Val Ala Ala Arg Pro Ala His Asp
260 265 270
Leu Ala Leu Gln Pro Gln Ala Ala Leu Thr Pro Leu Pro Asp Gly Pro
275 280 285

Gly	Val	Pro	Pro	Val	Leu	Leu	Ala	Gly	Ala	Gly	Pro	Gly	Pro	Ser	Arg
290						295					300				
His	Pro	Ala	Ala	Gly	Arg	Arg	Cys	Ala	Pro	Ala	Ala	Pro	Gly	Ala	Phe
305					310					315					320
Ala	Ala	Pro	Ala	Thr	Ala	Ala	Ala	Ala	Val	Thr	Ala	Arg	Cys	Val	Gly
				325					330					335	
His	Arg	Arg	Arg	Gly	Gly	Ala	Pro	Cys	Arg	Gly	Arg	Leu	Pro	Thr	Cys
			340					345					350		
Gly	Arg	Arg	Ala	Val	Gly	Gly	Arg	Thr	Ala	Ala	Pro	Asp	Gly	His	Glu
		355					360					365			
Ser	Val	Arg	Gly	Arg	Val	Val	Val	Gly	Arg	Ala	Ala	Pro	Asp	Arg	Leu
	370					375						380			
Arg	Ala	Gly	Val	Asp	Gln	Arg	Gly	Pro	Gly	Leu	Ala	Ala	Leu	Leu	Arg
385					390					395					400
Asp	Pro	His	His	Leu	Gly	Ala	Arg	Leu	Glu	Leu	Leu	Gly	Arg	Val	Leu
				405					410					415	
Arg	Asp	Arg	Ala	Ala	Arg	Gln	Val	Ala	Pro	Asp	Glu	His	Thr	Glu	Glu
			420					425					430		
Val	Glu	Arg	His	Leu	Pro	Ala	Asp	Ala	Asp	Leu	His	Glu	His	Leu	Leu
		435					440					445			
Arg	Gly	Arg	Gly	Val	Leu	Gln	Leu	Gln	Gln	Gly	Ala	Val	Ala	Leu	Leu
	450					455					460				
Val	Ser	Arg	Ser	Ser	Thr	Ser	Leu	Ser	Gly	Leu	Pro	Ser	Tyr	Thr	Gln
465					470					475					480
Leu	Met	Val	Ser	Arg	Arg	Gly	Gly	Ser	Gln	Arg	Arg	Met	Ser	Pro	Leu
				485					490					495	
Ala	Leu	Pro	Cys	Arg	Ala	Lys	Leu	Pro	Pro	Ser	Arg	Arg	Ser	Pro	Leu
			500					505					510		
Gly	Ser	Met	Asn	Gln	Arg	Leu	Met	Arg	Phe	Gly	Ser	Val	Gln	Ala	Leu
		515					520					525			
Gln	Thr	Ser	Ser	Thr	Gly	Ala	Ser	Tyr	Arg	Cys	Arg	Met	Met	Met	Leu
	530					535					540				
Arg	Ala	Ser	Pro	Ala	Gly	Met	Val	Arg	Arg	Pro	Arg	Ala	Arg	Ser	Val
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Ala															

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<211> 792

<212> DNA

<213> Bacteria

<220>

<221> CDS

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Met	Arg	Trp	Arg	Leu	Arg	Met	Asp	Ser	Gly	Asp	Gly	Gln	Asp	Leu	Arg	
1				5					10					15		

gcg	ttc	gtg	cac	gac	tca	ccg	gag	gag	acg	gag	acc	acc	cag	cgc	ctg	96
Ala	Phe	Val	His	Asp	Ser	Pro	Glu	Glu	Thr	Glu	Thr	Thr	Gln	Arg	Leu	
			20					25					30			

acg	aag	ctc	ttg	acc	aac	tct	ccg	atc	ccc	acg	gag	gaa	ctg	gtc	aac	144
Thr	Lys	Leu	Leu	Thr	Asn	Ser	Pro	Ile	Pro	Thr	Glu	Glu	Leu	Val	Asn	

35	40	45	
aac ctc ccc ctg ttc ctg cgc cgc cac cag atg acc gat ctg ctc tcg			192
Asn Leu Pro Leu Phe Leu Arg Arg His Gln Met Thr Asp Leu Leu Ser			
50	55	60	
atg gac gcg ctc tac cgt cag gtc ctc gac gtg ccg ggc gtg atc atg			240
Met Asp Ala Leu Tyr Arg Gln Val Leu Asp Val Pro Gly Val Ile Met			
65	70	75	80
gag ttc ggc gtc cgg ttc ggc cgt cac ctc ggc acg ttc gcc gcc ctg			288
Glu Phe Gly Val Arg Phe Gly Arg His Leu Gly Thr Phe Ala Ala Leu			
	85	90	95
cgc ggt gtc tac gag ccc tac aac ccg ctg cgc cgc atc gtc ggc ttc			336
Arg Gly Val Tyr Glu Pro Tyr Asn Pro Leu Arg Arg Ile Val Gly Phe			
	100	105	110
gac acc ttc acc ggc ttc ccc gac gtc aac gac gtc gac cgc gtc ggc			384
Asp Thr Phe Thr Gly Phe Pro Asp Val Asn Asp Val Asp Arg Val Gly			
	115	120	125
ccc acg gcg tac cag ggc cgc ttc gca gtg ccc ggg ggc tat ccg gcg			432
Pro Thr Ala Tyr Gln Gly Arg Phe Ala Val Pro Gly Gly Tyr Pro Ala			
	130	135	140
tac ctg aaa gag gtg ctg gac gcg cac gag tgc agc gac ttc ttc ggc			480
Tyr Leu Lys Glu Val Leu Asp Ala His Glu Cys Ser Asp Phe Phe Gly			
	145	150	155
cac gtg acg cag cgc agc gtg ctc gtc gag ggg gac gta cgg gag acg			528
His Val Thr Gln Arg Ser Val Leu Val Glu Gly Asp Val Arg Glu Thr			
	165	170	175
gtg ccg cgc tac ctc gcg gag aac ccg cag acc gtc atc gcg ctg gcg			576
Val Pro Arg Tyr Leu Ala Glu Asn Pro Gln Thr Val Ile Ala Leu Ala			
	180	185	190
tac ttc gac ctc gac ctc tac gag ccg acg aag gcc gtc ctg gag gcg			624
Tyr Phe Asp Leu Asp Leu Tyr Glu Pro Thr Lys Ala Val Leu Glu Ala			
	195	200	205
atc cgc ccc tac ctc acc aag ggc agc atc gtc gcc ttc gac gaa ctc			672
Ile Arg Pro Tyr Leu Thr Lys Gly Ser Ile Val Ala Phe Asp Glu Leu			
	210	215	220
gac aat ccg aag tgg ccc ggc gag aac atc gcg atg ccg aag gtg ctc			720
Asp Asn Pro Lys Trp Pro Gly Glu Asn Ile Ala Met Arg Lys Val Leu			
	225	230	235
ggg ctg gac cac gcc ccg ctg cgc ctg ctg ccg ggc cgc ccg gcg ccg			768
Gly Leu Asp His Ala Pro Leu Arg Leu Leu Pro Gly Arg Pro Ala Pro			
	245	250	255
gcg tac ctg cgg tgg ggc gac tga			792
Ala Tyr Leu Arg Trp Gly Asp *			
	260		

<210> 12
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 <212> PRT
 <213> Bacteria

<400> 12

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Met Arg Trp Arg Leu Arg Met Asp Ser Gly Asp Gly Gln Asp Leu Arg
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      20           25           30
Thr Lys Leu Leu Thr Asn Ser Pro Ile Pro Thr Glu Glu Leu Val Asn
      35           40           45
Asn Leu Pro Leu Phe Leu Arg Arg His Gln Met Thr Asp Leu Leu Ser
      50           55           60
Met Asp Ala Leu Tyr Arg Gln Val Leu Asp Val Pro Gly Val Ile Met
65           70           75           80
Glu Phe Gly Val Arg Phe Gly Arg His Leu Gly Thr Phe Ala Ala Leu
      85           90           95
Arg Gly Val Tyr Glu Pro Tyr Asn Pro Leu Arg Arg Ile Val Gly Phe
      100          105          110
Asp Thr Phe Thr Gly Phe Pro Asp Val Asn Asp Val Asp Arg Val Gly
      115          120          125
Pro Thr Ala Tyr Gln Gly Arg Phe Ala Val Pro Gly Gly Tyr Pro Ala
      130          135          140
Tyr Leu Lys Glu Val Leu Asp Ala His Glu Cys Ser Asp Phe Phe Gly
145          150          155          160
His Val Thr Gln Arg Ser Val Leu Val Glu Gly Asp Val Arg Glu Thr
      165          170          175
Val Pro Arg Tyr Leu Ala Glu Asn Pro Gln Thr Val Ile Ala Leu Ala
      180          185          190
Tyr Phe Asp Leu Asp Leu Tyr Glu Pro Thr Lys Ala Val Leu Glu Ala
      195          200          205
Ile Arg Pro Tyr Leu Thr Lys Gly Ser Ile Val Ala Phe Asp Glu Leu
      210          215          220
Asp Asn Pro Lys Trp Pro Gly Glu Asn Ile Ala Met Arg Lys Val Leu
225          230          235          240
Gly Leu Asp His Ala Pro Leu Arg Leu Leu Pro Gly Arg Pro Ala Pro
      245          250          255
Ala Tyr Leu Arg Trp Gly Asp
      260
  
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<210> 13
 <211> 738
 <212> DNA
 <213> Bacteria

<220>

<221> CDS

<222> (1) ... (738)

<400> 13

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 1           5           10           15

cgc ggc aag agc tgg cac gac gag gcg gcg gac gtg gcc gac cgg atc   96
Arg Gly Lys Ser Trp His Asp Glu Ala Ala Asp Val Ala Asp Arg Ile
  
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20

25

30

cgg gcc gcc cgc ccc gac gcc gcc cgg ctg ctc gac gtc ggc tgc ggc 144
 Arg Ala Ala Arg Pro Asp Ala Ala Arg Leu Leu Asp Val Gly Cys Gly
 35 40 45

acc ggc gcg cac ctc gag acc ttc gcg acc cgc ttc ccc cac gtg gag 192
 Thr Gly Ala His Leu Glu Thr Phe Ala Thr Arg Phe Pro His Val Glu
 50 55 60

ggg ctc gaa ctg gcc ccg gcg atg ctg gcg ctc gcc cga cac cgg ctg 240
 Gly Leu Glu Leu Ala Pro Ala Met Leu Ala Leu Ala Arg His Arg Leu
 65 70 75 80

ccc ggg gtg cgc ctg cac gcc ggg gac atg cgg acg ttc gac ctt ggc 288
 Pro Gly Val Arg Leu His Ala Gly Asp Met Arg Thr Phe Asp Leu Gly
 85 90 95

gtc acg ttc gac gcg gtg acc tgc ctg ttc acc gcg gtc aac ttc ctc 336
 Val Thr Phe Asp Ala Val Thr Cys Leu Phe Thr Ala Val Asn Phe Leu
 100 105 110

ggc acg gtg gcc gag atg cgg gcg gcc gtg gcc gcg atg tcg gcc cac 384
 Gly Thr Val Ala Glu Met Arg Ala Ala Val Ala Ala Met Ser Ala His
 115 120 125

ctg gcg ccg ggc ggc gtg ctg gtg ctc gaa ccg tgg tgg ttc ccg gag 432
 Leu Ala Pro Gly Gly Val Leu Val Leu Glu Pro Trp Trp Phe Pro Glu
 130 135 140

cgg ttc atc gac ggg tac gtc ggc ggc gac ctg gtg cgc gag gag ggc 480
 Arg Phe Ile Asp Gly Tyr Val Gly Gly Asp Leu Val Arg Glu Glu Gly
 145 150 155 160

cgc acg gtg gcg cgg gtg tcg cgg tcc acc cgg cag gga cgg gtg acg 528
 Arg Thr Val Ala Arg Val Ser Arg Ser Thr Arg Gln Gly Arg Val Thr
 165 170 175

cgg atg gag gag cgc tgg ctc gtc ggc gac gcc gcc ggg atc cgg gag 576
 Arg Met Glu Glu Arg Trp Leu Val Gly Asp Ala Ala Gly Ile Arg Glu
 180 185 190

ttc agc cag gtc ggc ctg ctc acc atg ttc acc cgc gag gag tac gac 624
 Phe Ser Gln Val Gly Leu Leu Thr Met Phe Thr Arg Glu Glu Tyr Asp
 195 200 205

gcg gcg ttc gcc gct gcc ggc tgc gag tcc gcg tac gtc gag ggc tgg 672
 Ala Ala Phe Ala Ala Ala Gly Cys Glu Ser Ala Tyr Val Glu Gly Trp
 210 215 220

ctg acc ggc cgg ggc ctt ttc gtg gcg acg cgt acc ggt gga cac gcc 720
 Leu Thr Gly Arg Gly Leu Phe Val Ala Thr Arg Thr Gly Gly His Ala
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 Thr Pro Thr Met Val *
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 35 40 45
 Thr Gly Ala His Leu Glu Thr Phe Ala Thr Arg Phe Pro His Val Glu
 50 55 60
 Gly Leu Glu Leu Ala Pro Ala Met Leu Ala Leu Ala Arg His Arg Leu
 65 70 75 80
 Pro Gly Val Arg Leu His Ala Gly Asp Met Arg Thr Phe Asp Leu Gly
 85 90 95
 Val Thr Phe Asp Ala Val Thr Cys Leu Phe Thr Ala Val Asn Phe Leu
 100 105 110
 Gly Thr Val Ala Glu Met Arg Ala Ala Val Ala Ala Met Ser Ala His
 115 120 125
 Leu Ala Pro Gly Gly Val Leu Val Leu Glu Pro Trp Trp Phe Pro Glu
 130 135 140
 Arg Phe Ile Asp Gly Tyr Val Gly Gly Asp Leu Val Arg Glu Glu Gly
 145 150 155 160
 Arg Thr Val Ala Arg Val Ser Arg Ser Thr Arg Gln Gly Arg Val Thr
 165 170 175
 Arg Met Glu Glu Arg Trp Leu Val Gly Asp Ala Ala Gly Ile Arg Glu
 180 185 190
 Phe Ser Gln Val Gly Leu Leu Thr Met Phe Thr Arg Glu Glu Tyr Asp
 195 200 205
 Ala Ala Phe Ala Ala Ala Gly Cys Glu Ser Ala Tyr Val Glu Gly Trp
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 Thr Pro Thr Met Val
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 tac ggg ccc ggt ggc ctc gac cac ctg gac ccc gcc gcc gcg tac tac 96
 Tyr Gly Pro Gly Gly Leu Asp His Leu Asp Pro Ala Ala Ala Tyr Tyr
 20 25 30

gcc ttc tcc cac cag gtc atc cgg ctc ttc gcc cgg cag ctg ttc agc	144
Ala Phe Ser His Gln Val Ile Arg Leu Phe Ala Arg Gln Leu Phe Ser	
35 40 45	
tac ccg acc acg gag gac gcc gcc gcg ctg gtg ccg gtg ccc gac gtg	192
Tyr Pro Thr Thr Glu Asp Ala Ala Ala Leu Val Pro Val Pro Asp Val	
50 55 60	
gcc gcc gag ttg ccc acg gtg gac aat ggc ggg ctc agc gag gac ggc	240
Ala Ala Glu Leu Pro Thr Val Asp Asn Gly Gly Leu Ser Glu Asp Gly	
65 70 75 80	
cgc acg tac acg atc cgc ctg cgc gac ggg gtc ccg tgg gac acc gcc	288
Arg Thr Tyr Thr Ile Arg Leu Arg Asp Gly Val Arg Trp Asp Thr Ala	
85 90 95	
ccg ccg cgg ccg gtg acc gcg ggg gac ttc gtg cgc ggc ttc aag cgg	336
Pro Pro Arg Pro Val Thr Ala Gly Asp Phe Val Arg Gly Phe Lys Arg	
100 105 110	
atg gcc aac ccg gtc gcc ggg gcc ggc gcc atc gcc tac tac acg agc	384
Met Ala Asn Pro Val Ala Gly Ala Gly Ala Ile Ala Tyr Tyr Thr Ser	
115 120 125	
acc atc gcc ggc atg gcg gag ttc gcc gag ggc tac cgc gcg cgc ttc	432
Thr Ile Ala Gly Met Ala Glu Phe Ala Glu Gly Tyr Arg Ala Arg Phe	
130 135 140	
gcc ggg cgt acg ccc acc gcc gcc gag ctg gcc gac tac cag aac ggc	480
Ala Gly Arg Thr Pro Thr Ala Ala Glu Leu Ala Asp Tyr Gln Asn Gly	
145 150 155 160	
cac gag atc agc ggg ctg tgg gcc aag gac gac cgc acc ctg gtg atc	528
His Glu Ile Ser Gly Leu Trp Ala Lys Asp Asp Arg Thr Leu Val Ile	
165 170 175	
gag ctg ctg cgc ccc gcc aac gac atg ctc aac ctg ctg gcg atg ccg	576
Glu Leu Leu Arg Pro Ala Asn Asp Met Leu Asn Leu Leu Ala Met Pro	
180 185 190	
ttc gcc tcc gcc gcg ccc cgg gag ttc gac gac ctc gtc ccg gac ggt	624
Phe Ala Ser Ala Ala Pro Arg Glu Phe Asp Asp Leu Val Pro Asp Gly	
195 200 205	
ccg gac ttc gcg cgg ctg gtc cgc tcc aac ggg ccg tac cgg atc acc	672
Pro Asp Phe Ala Arg Leu Val Arg Ser Asn Gly Pro Tyr Arg Ile Thr	
210 215 220	
ggc tac gcc cgg ggc agc cac ctg acc atg gac cac aac ccc gcc tgg	720
Gly Tyr Ala Arg Gly Ser His Leu Thr Met Asp His Asn Pro Ala Trp	
225 230 235 240	
cgg gcc gac gca gac ccg atc cgc cgc cgc tac gtg gac cgt atc gag	768
Arg Ala Asp Ala Asp Pro Ile Arg Arg Arg Tyr Val Asp Arg Ile Glu	
245 250 255	
gtg cgg atg gcg agg gtg agc gac gag cgg gtc cgc gcc gag atc gag	816
Val Arg Met Ala Arg Val Ser Asp Glu Arg Val Arg Ala Glu Ile Glu	

260	265	270	
agc ggg gcg gcc gac ctg tgc tgg ggc gcc gcc gtg ggc agg ccc cgc			864
Ser Gly Ala Ala Asp Leu Ser Trp Gly Ala Ala Val Gly Arg Pro Arg			
275	280	285	
cgg cgt acg gcg gcc gac cgg aac ctc ggc tgg gcg ctg aac ccc tac			912
Arg Arg Thr Ala Ala Asp Arg Asn Leu Gly Trp Ala Leu Asn Pro Tyr			
290	295	300	
ctg gcg ttc aac ctg cac agc ccg cac gag cgg ggg gcg ctg cgc gac			960
Leu Ala Phe Asn Leu His Ser Pro His Glu Arg Gly Ala Leu Arg Asp			
305	310	315	320
cgg acc gtc cgg ctg gcg atc gcg tac gcc gtc gac aag gcg cgg ctc			1008
Arg Thr Val Arg Leu Ala Ile Ala Tyr Ala Val Asp Lys Ala Arg Leu			
325	330	335	
gtc cgg ttc ttc gac gac atg aac atc ggc acg gtg acc cgc ccc gcg			1056
Val Arg Phe Phe Asp Asp Met Asn Ile Gly Thr Val Thr Arg Pro Ala			
340	345	350	
cac acg gcc atc ccg ccg ggc aac ttc ggc cac cgc gag tac gac ccg			1104
His Thr Ala Ile Pro Pro Gly Asn Phe Gly His Arg Glu Tyr Asp Pro			
355	360	365	
tac ccg acg ccg ggg gac cgg ggc gac cgg gcg cgc tgc cgg gag ctg			1152
Tyr Pro Thr Pro Gly Asp Arg Gly Asp Arg Ala Arg Cys Arg Glu Leu			
370	375	380	
ctc gcc gag gcc ggg tac ccc gac ggg ctg cgg ctc acc atg atc tac			1200
Leu Ala Glu Ala Gly Tyr Pro Asp Gly Leu Arg Leu Thr Met Ile Tyr			
385	390	395	400
cgg atc gac gcg gtg cac ggc cag gtg gcc aag gcg atc gcc gag gac			1248
Arg Ile Asp Ala Val His Gly Gln Val Ala Lys Ala Ile Ala Glu Asp			
405	410	415	
ctg ggc gcg ggc ggc gtc gac gtc cgg ctg gtc gag atc gac cag acc			1296
Leu Gly Ala Gly Gly Val Asp Val Arg Leu Val Glu Ile Asp Gln Thr			
420	425	430	
gac gag tac tac cgc atc ctc cag gac ccg gcc cgc gcg gcg gcg ggg			1344
Asp Glu Tyr Tyr Arg Ile Leu Gln Asp Pro Ala Arg Ala Ala Gly			
435	440	445	
gag tgg gac atc acg ccg gcc gcc tgg atg ccg gac tgg ttc ggc aac			1392
Glu Trp Asp Ile Thr Pro Ala Ala Trp Met Pro Asp Trp Phe Gly Asn			
450	455	460	
aac ggg cgg tgc tac gtc cag ccg atg ttc cag tcc aac acc ggc gtc			1440
Asn Gly Arg Ser Tyr Val Gln Pro Met Phe Gln Ser Asn Thr Gly Val			
465	470	475	480
ggc acg gcc aac tac ggc ggc tac cac aac ccg ctc gtc gac gag ctg			1488
Gly Thr Ala Asn Tyr Gly Gly Tyr His Asn Pro Leu Val Asp Glu Leu			
485	490	495	

atc gac cgc gcg ttg tcc gcc cgg acg gag gcc gag gcg gag gag ctg	1536
Ile Asp Arg Ala Leu Ser Ala Arg Thr Glu Ala Glu Ala Glu Glu Leu	
500 505 510	
tgg cac cgg gtc gac cgg cag gtg ctg cag gac gtg gcg atc gtg ccg	1584
Trp His Arg Val Asp Arg Gln Val Leu Gln Asp Val Ala Ile Val Pro	
515 520 525	
atc ctg gcc tgc gag ccg acc atc gag cac ctg acc agt tcc cgg gtg	1632
Ile Leu Ala Cys Glu Pro Thr Ile Glu His Leu Thr Ser Ser Arg Val	
530 535 540	
cgg ggg gcg atc ccg ctg ccg cac gtg gac cgc tgg tac gac gcg gcg	1680
Arg Gly Ala Ile Pro Leu Pro His Val Asp Arg Trp Tyr Asp Ala Ala	
545 550 555 560	
aac ctc tgg ctg gac ccg ccc gac tga	1707
Asn Leu Trp Leu Asp Pro Pro Asp *	
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 <211> 568
 <212> PRT
 <213> Bacteria

<400> 16

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			20					25					30		
Ala	Phe	Ser	His	Gln	Val	Ile	Arg	Leu	Phe	Ala	Arg	Gln	Leu	Phe	Ser
		35					40					45			
Tyr	Pro	Thr	Thr	Glu	Asp	Ala	Ala	Ala	Leu	Val	Pro	Val	Pro	Asp	Val
	50					55					60				
Ala	Ala	Glu	Leu	Pro	Thr	Val	Asp	Asn	Gly	Gly	Leu	Ser	Glu	Asp	Gly
65					70				75					80	
Arg	Thr	Tyr	Thr	Ile	Arg	Leu	Arg	Asp	Gly	Val	Arg	Trp	Asp	Thr	Ala
				85				90					95		
Pro	Pro	Arg	Pro	Val	Thr	Ala	Gly	Asp	Phe	Val	Arg	Gly	Phe	Lys	Arg
			100					105					110		
Met	Ala	Asn	Pro	Val	Ala	Gly	Ala	Gly	Ala	Ile	Ala	Tyr	Tyr	Thr	Ser
		115					120					125			
Thr	Ile	Ala	Gly	Met	Ala	Glu	Phe	Ala	Glu	Gly	Tyr	Arg	Ala	Arg	Phe
	130						135					140			
Ala	Gly	Arg	Thr	Pro	Thr	Ala	Ala	Glu	Leu	Ala	Asp	Tyr	Gln	Asn	Gly
145					150					155					160
His	Glu	Ile	Ser	Gly	Leu	Trp	Ala	Lys	Asp	Asp	Arg	Thr	Leu	Val	Ile
				165					170					175	
Glu	Leu	Leu	Arg	Pro	Ala	Asn	Asp	Met	Leu	Asn	Leu	Leu	Ala	Met	Pro
			180					185					190		
Phe	Ala	Ser	Ala	Ala	Pro	Arg	Glu	Phe	Asp	Asp	Leu	Val	Pro	Asp	Gly
		195					200					205			
Pro	Asp	Phe	Ala	Arg	Leu	Val	Arg	Ser	Asn	Gly	Pro	Tyr	Arg	Ile	Thr
	210					215					220				
Gly	Tyr	Ala	Arg	Gly	Ser	His	Leu	Thr	Met	Asp	His	Asn	Pro	Ala	Trp
225					230					235				240	
Arg	Ala	Asp	Ala	Asp	Pro	Ile	Arg	Arg	Arg	Tyr	Val	Asp	Arg	Ile	Glu

(a) $\frac{1}{2} \log \frac{1}{2}$ (b) $\frac{1}{2} \log \frac{1}{2}$ (c) $\frac{1}{2} \log \frac{1}{2}$ (d) $\frac{1}{2} \log \frac{1}{2}$ (e) $\frac{1}{2} \log \frac{1}{2}$ (f) $\frac{1}{2} \log \frac{1}{2}$ (g) $\frac{1}{2} \log \frac{1}{2}$ (h) $\frac{1}{2} \log \frac{1}{2}$ (i) $\frac{1}{2} \log \frac{1}{2}$ (j) $\frac{1}{2} \log \frac{1}{2}$ (k) $\frac{1}{2} \log \frac{1}{2}$ (l) $\frac{1}{2} \log \frac{1}{2}$ (m) $\frac{1}{2} \log \frac{1}{2}$ (n) $\frac{1}{2} \log \frac{1}{2}$ (o) $\frac{1}{2} \log \frac{1}{2}$ (p) $\frac{1}{2} \log \frac{1}{2}$ (q) $\frac{1}{2} \log \frac{1}{2}$ (r) $\frac{1}{2} \log \frac{1}{2}$ (s) $\frac{1}{2} \log \frac{1}{2}$ (t) $\frac{1}{2} \log \frac{1}{2}$ (u) $\frac{1}{2} \log \frac{1}{2}$ (v) $\frac{1}{2} \log \frac{1}{2}$ (w) $\frac{1}{2} \log \frac{1}{2}$ (x) $\frac{1}{2} \log \frac{1}{2}$ (y) $\frac{1}{2} \log \frac{1}{2}$ (z) $\frac{1}{2} \log \frac{1}{2}$

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<222> (1) ... (999)
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DC01 348871 v 1

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gac	cac	ctg	gtc	gac	ggc	ccc	cgt	acg	ccc	gcc	gag	ctg	gcc	gcc	gcg	144
Asp	His	Leu	Val	Asp	Gly	Pro	Arg	Thr	Pro	Ala	Glu	Leu	Ala	Ala	Ala	
		35					40				45					
acg	ggc	acc	gac	gcg	gac	gcg	ctc	cgc	cgg	gtg	ctg	cgc	ctg	ctg	gcg	192
Thr	Gly	Thr	Asp	Ala	Asp	Ala	Leu	Arg	Arg	Val	Leu	Arg	Leu	Leu	Ala	
	50					55					60					
gtc	cgc	gac	gtg	gtc	cgc	gag	tcc	gac	ggc	cgg	ttc	gcg	ctg	acc	gac	240
Val	Arg	Asp	Val	Val	Arg	Glu	Ser	Asp	Gly	Arg	Phe	Ala	Leu	Thr	Asp	
	65				70				75						80	
aag	ggc	gcg	gcg	ctg	cgg	tcg	gac	tcg	ccg	gtg	ccc	gcg	cgg	gcc	ggc	288
Lys	Gly	Ala	Ala	Leu	Arg	Ser	Asp	Ser	Pro	Val	Pro	Ala	Arg	Ala	Gly	
			85						90					95		
atc	ctc	atg	ttc	acc	gac	acg	atg	ttc	tgg	acg	atg	agt	cac	cgg	gtg	336
Ile	Leu	Met	Phe	Thr	Asp	Thr	Met	Phe	Trp	Thr	Met	Ser	His	Arg	Val	
			100					105					110			
gcg	agc	gcg	ctg	ggg	ccg	gag	cga	ccc	gcc	ttc	gcc	gac	atc	ttc	ggc	384
Ala	Ser	Ala	Leu	Gly	Pro	Glu	Arg	Pro	Ala	Phe	Ala	Asp	Ile	Phe	Gly	
		115				120						125				
agc	tcg	ctg	gac	gcc	tac	ttc	gac	ggc	gac	gcc	gag	gtc	gag	gcg	ctc	432
Ser	Ser	Leu	Asp	Ala	Tyr	Phe	Asp	Gly	Asp	Ala	Glu	Val	Glu	Ala	Leu	
	130					135					140					
tac	tac	gag	ggc	atg	gaa	acg	gtc	agc	gcg	gcg	gag	cac	ctc	att	ctc	480
Tyr	Tyr	Glu	Gly	Met	Glu	Thr	Val	Ser	Ala	Ala	Glu	His	Leu	Ile	Leu	
	145				150				155						160	
gcc	cgc	gcc	ggc	gac	ttc	ccc	gcc	acc	ggc	acc	gtg	gcg	gac	gtc	ggc	528
Ala	Arg	Ala	Gly	Asp	Phe	Pro	Ala	Thr	Gly	Thr	Val	Ala	Asp	Val	Gly	
			165						170					175		
ggc	ggc	cgg	ggc	ggc	ttc	ctg	ctc	acc	gtc	cta	cgc	gag	cac	ccc	ggc	576
Gly	Gly	Arg	Gly	Gly	Phe	Leu	Leu	Thr	Val	Leu	Arg	Glu	His	Pro	Gly	
		180						185				190				
ctg	cag	ggc	gtg	ctg	ctg	gac	cgc	gcg	gag	gtg	gtc	gcc	cgg	cac	cgg	624
Leu	Gln	Gly	Val	Leu	Leu	Asp	Arg	Ala	Glu	Val	Val	Ala	Arg	His	Arg	
		195					200					205				
ctg	gac	gcc	ccg	gac	gtg	gcg	ggg	cgc	tgg	aag	gtt	gtc	gag	ggc	gac	672
Leu	Asp	Ala	Pro	Asp	Val	Ala	Gly	Arg	Trp	Lys	Val	Val	Glu	Gly	Asp	
	210					215					220					
ttc	ctc	cgc	gag	gtg	ccc	cac	gcc	gac	gtg	cac	gtg	ctc	aag	cgc	atc	720
Phe	Leu	Arg	Glu	Val	Pro	His	Ala	Asp	Val	His	Val	Leu	Lys	Arg	Ile	
	225				230				235						240	
ctg	cac	aac	tgg	ggc	gac	gag	gac	agc	gtc	cgg	atc	ctg	acg	aac	tgc	768
Leu	His	Asn	Trp	Gly	Asp	Glu	Asp	Ser	Val	Arg	Ile	Leu	Thr	Asn	Cys	
			245					250						255		

cgc cgg gtc atg ccc gcg cac ggc cgg gtg ctc gtg atc gac gcg gtc	816
Arg Arg Val Met Pro Ala His Gly Arg Val Leu Val Ile Asp Ala Val	
260 265 270	
gtc ccc gag ggc aac gac gcg cac cag agc aag gag atg gac ttc atg	864
Val Pro Glu Gly Asn Asp Ala His Gln Ser Lys Glu Met Asp Phe Met	
275 280 285	
atg ctc gcc gcg cgc acc ggc cag gaa cgc acc gcc gcc gag ctg gag	912
Met Leu Ala Ala Arg Thr Gly Gln Glu Arg Thr Ala Ala Glu Leu Glu	
290 295 300	
ccg ttg ttc acc gcg gcc ggg ctg cgc ctg gac cgg gtc gtc ggc acc	960
Pro Leu Phe Thr Ala Ala Gly Leu Arg Leu Asp Arg Val Val Gly Thr	
305 310 315 320	
tcg tcg gtc atg tcc atc gcg gtc ggc gtg ccg gcc tga	999
Ser Ser Val Met Ser Ile Ala Val Gly Val Pro Ala *	
325 330	

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35 40 45	
Thr Gly Thr Asp Ala Asp Ala Leu Arg Arg Val Leu Arg Leu Leu Ala	
50 55 60	
Val Arg Asp Val Val Arg Glu Ser Asp Gly Arg Phe Ala Leu Thr Asp	
65 70 75 80	
Lys Gly Ala Ala Leu Arg Ser Asp Ser Pro Val Pro Ala Arg Ala Gly	
85 90 95	
Ile Leu Met Phe Thr Asp Thr Met Phe Trp Thr Met Ser His Arg Val	
100 105 110	
Ala Ser Ala Leu Gly Pro Glu Arg Pro Ala Phe Ala Asp Ile Phe Gly	
115 120 125	
Ser Ser Leu Asp Ala Tyr Phe Asp Gly Asp Ala Glu Val Glu Ala Leu	
130 135 140	
Tyr Tyr Glu Gly Met Glu Thr Val Ser Ala Ala Glu His Leu Ile Leu	
145 150 155 160	
Ala Arg Ala Gly Asp Phe Pro Ala Thr Gly Thr Val Ala Asp Val Gly	
165 170 175	
Gly Gly Arg Gly Gly Phe Leu Leu Thr Val Leu Arg Glu His Pro Gly	
180 185 190	
Leu Gln Gly Val Leu Leu Asp Arg Ala Glu Val Val Ala Arg His Arg	
195 200 205	
Leu Asp Ala Pro Asp Val Ala Gly Arg Trp Lys Val Val Glu Gly Asp	
210 215 220	
Phe Leu Arg Glu Val Pro His Ala Asp Val His Val Leu Lys Arg Ile	
225 230 235 240	

Leu	His	Asn	Trp	Gly	Asp	Glu	Asp	Ser	Val	Arg	Ile	Leu	Thr	Asn	Cys
				245					250					255	
Arg	Arg	Val	Met	Pro	Ala	His	Gly	Arg	Val	Leu	Val	Ile	Asp	Ala	Val
			260					265					270		
Val	Pro	Glu	Gly	Asn	Asp	Ala	His	Gln	Ser	Lys	Glu	Met	Asp	Phe	Met
		275					280					285			
Met	Leu	Ala	Ala	Arg	Thr	Gly	Gln	Glu	Arg	Thr	Ala	Ala	Glu	Leu	Glu
	290					295					300				
Pro	Leu	Phe	Thr	Ala	Ala	Gly	Leu	Arg	Leu	Asp	Arg	Val	Val	Gly	Thr
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Ser	Ser	Val	Met	Ser	Ile	Ala	Val	Gly	Val	Pro	Ala				
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 <213> Bacteria

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ccg	gcg	cag	agt	ccg	ctg	cgc	acc	gcg	tcc	tgg	gcc	cgc	atc	cgc	gag	96
Pro	Ala	Gln	Ser	Pro	Leu	Arg	Thr	Ala	Ser	Trp	Ala	Arg	Ile	Arg	Glu	
			20					25					30			
ctg	ttc	gcc	ctg	gac	ccg	acg	acc	gtg	cac	ctc	aac	acg	ggg	acg	gtc	144
Leu	Phe	Ala	Leu	Asp	Pro	Thr	Thr	Val	His	Leu	Asn	Thr	Gly	Thr	Val	
		35					40					45				
ggc	gcc	atg	ccg	tac	gag	gtg	ctg	gac	acc	gtg	gac	cgg	gtg	acc	cgc	192
Gly	Ala	Met	Pro	Tyr	Glu	Val	Leu	Asp	Thr	Val	Asp	Arg	Val	Thr	Arg	
	50					55					60					
cag	tgg	acc	ggc	ggc	ctg	ctc	gac	gtc	tac	cgc	ccg	gcg	atg	ttc	acc	240
Gln	Trp	Thr	Gly	Gly	Leu	Leu	Asp	Val	Tyr	Arg	Pro	Ala	Met	Phe	Thr	
65					70				75					80		
gag	tac	cgg	gac	gcc	atc	gcg	aag	acg	ttc	ggc	gtg	gac	ggc	gac	gag	288
Glu	Tyr	Arg	Asp	Ala	Ile	Ala	Lys	Thr	Phe	Gly	Val	Asp	Gly	Asp	Glu	
				85					90					95		
atc	gtg	atc	tgc	cac	aac	gcc	acc	gag	ggg	gtc	gcc	cgg	gtc	atc	cac	336
Ile	Val	Ile	Cys	His	Asn	Ala	Thr	Glu	Gly	Val	Ala	Arg	Val	Ile	His	
			100					105					110			
ggc	ctc	gac	ctg	cgc	gag	ggc	gac	gag	gtg	gtg	acg	acc	acg	cac	gag	384
Gly	Leu	Asp	Leu	Arg	Glu	Gly	Asp	Glu	Val	Val	Thr	Thr	Thr	His	Glu	
		115					120					125				
tgc	tac	tcc	gtg	ctg	tcc	aac	ttc	aac	ctg	ctg	cgc	aac	cgg	ttc	ggg	432
Cys	Tyr	Ser	Val	Leu	Ser	Asn	Phe	Asn	Leu	Leu	Arg	Asn	Arg	Phe	Gly	

130	135	140	
gtg gtg ctg aag acc gtc acc ccg ccg tcc ggc cac gag gtg cgc gcg			480
Val Val Leu Lys Thr Val Thr Pro Pro Ser Gly His Glu Val Arg Ala			
145	150	155	160
gag gag atc gtc gag ctg gtc gag gcc gcc atc acg ccc cgg acg aag			528
Glu Glu Ile Val Glu Leu Val Glu Ala Ala Ile Thr Pro Arg Thr Lys			
	165	170	175
gtg ctc tcg ttc gcc gcg atc acc ctc ttc acc ggg acg atg ttc ccc			576
Val Leu Ser Phe Ala Ala Ile Thr Leu Phe Thr Gly Thr Met Phe Pro			
	180	185	190
atc cgg cag ctc tgc gag ctg gcg cac ccg cac ggg ctg acc acc gtc			624
Ile Arg Gln Leu Cys Glu Leu Ala His Arg His Gly Leu Thr Thr Val			
	195	200	205
atc gac ggc gcg ctg atc ccc ggc atg ctc gac tgc gac ctg cgc gcg			672
Ile Asp Gly Ala Leu Ile Pro Gly Met Leu Asp Cys Asp Leu Arg Ala			
	210	215	220
acc ggg gcg gac ttc atc acc tgc tcc ggg tcg aag ttc cag tgc ggc			720
Thr Gly Ala Asp Phe Ile Thr Cys Ser Gly Ser Lys Phe Gln Cys Gly			
	225	230	235
ccg ctc ggc acc ggc ctg atc tac gtc cgc aac aag gtc gtc ccc gag			768
Pro Leu Gly Thr Gly Leu Ile Tyr Val Arg Asn Lys Val Val Pro Glu			
	245	250	255
cac aac ccc ctg ccg ctg ccc acg ttc tgg ccg ctc atc tcg acc tgg			816
His Asn Pro Leu Pro Leu Pro Thr Phe Trp Pro Leu Ile Ser Thr Trp			
	260	265	270
tac ccg atg atg ggc agc ccg ccg ccg ccg acc agc acc gcc gtg gag			864
Tyr Pro Met Met Gly Ser Pro Pro Pro Arg Thr Ser Thr Ala Val Glu			
	275	280	285
agc tac aac atg ggc gac ttc ctg cag agc gcc ggc agc gcc aac ctg			912
Ser Tyr Asn Met Gly Asp Phe Leu Gln Ser Ala Gly Ser Ala Asn Leu			
	290	295	300
gcg cgg ggc gcc gcc ctg gcc cgg gcc ttc gag ctg tgg gac gac atc			960
Ala Arg Gly Ala Ala Leu Ala Arg Ala Phe Glu Leu Trp Asp Asp Ile			
	305	310	315
ggc cgc gac cgc atc gag gcg tac atc atg gac ctc gcc gag tac gcc			1008
Gly Arg Asp Arg Ile Glu Ala Tyr Ile Met Asp Leu Ala Glu Tyr Ala			
	325	330	335
cgc ggc cgg ctc atc gac gcg ttc ggc gtc gag gcc atg tac tcc ccc			1056
Arg Gly Arg Leu Ile Asp Ala Phe Gly Val Glu Ala Met Tyr Ser Pro			
	340	345	350
ggc gcc gac ccg cgg ctg cgc tcg ccg ctg ctc gcg ttc aac ccg ttc			1104
Gly Ala Asp Pro Arg Leu Arg Ser Pro Leu Leu Ala Phe Asn Pro Phe			
	355	360	365

cgg cgg ccg gag gac gcc tgg aac atc aag aag ttc atc ggc ttc gtc	1152
Arg Arg Pro Glu Asp Ala Trp Asn Ile Lys Lys Phe Ile Gly Phe Val	
370 375 380	
aag cgc ctg gag acc gag cac cgg atc tgg acc cgc tgg acg gag ttc	1200
Lys Arg Leu Glu Thr Glu His Arg Ile Trp Thr Arg Trp Thr Glu Phe	
385 390 395 400	
gac gtg ccc ggc tcc ccg cac cag cac tac gcg gcg cgc atc acc acg	1248
Asp Val Pro Gly Ser Pro His Gln His Tyr Ala Ala Arg Ile Thr Thr	
405 410 415	
cac ctg ttc aac acc cgg gaa gag atc gac cac acc gta cgg acg atg	1296
His Leu Phe Asn Thr Arg Glu Glu Ile Asp His Thr Val Arg Thr Met	
420 425 430	
gtc cgc ctg gcc gag gag atg tct tga	1323
Val Arg Leu Ala Glu Glu Met Ser *	
435 440	

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 <213> Bacteria

<400> 20

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Leu Phe Ala Leu Asp Pro Thr Thr Val His Leu Asn Thr Gly Thr Val	
35 40 45	
Gly Ala Met Pro Tyr Glu Val Leu Asp Thr Val Asp Arg Val Thr Arg	
50 55 60	
Gln Trp Thr Gly Gly Leu Leu Asp Val Tyr Arg Pro Ala Met Phe Thr	
65 70 75 80	
Glu Tyr Arg Asp Ala Ile Ala Lys Thr Phe Gly Val Asp Gly Asp Glu	
85 90 95	
Ile Val Ile Cys His Asn Ala Thr Glu Gly Val Ala Arg Val Ile His	
100 105 110	
Gly Leu Asp Leu Arg Glu Gly Asp Glu Val Val Thr Thr His Glu	
115 120 125	
Cys Tyr Ser Val Leu Ser Asn Phe Asn Leu Leu Arg Asn Arg Phe Gly	
130 135 140	
Val Val Leu Lys Thr Val Thr Pro Pro Ser Gly His Glu Val Arg Ala	
145 150 155 160	
Glu Glu Ile Val Glu Leu Val Glu Ala Ala Ile Thr Pro Arg Thr Lys	
165 170 175	
Val Leu Ser Phe Ala Ala Ile Thr Leu Phe Thr Gly Thr Met Phe Pro	
180 185 190	
Ile Arg Gln Leu Cys Glu Leu Ala His Arg His Gly Leu Thr Thr Val	
195 200 205	
Ile Asp Gly Ala Leu Ile Pro Gly Met Leu Asp Cys Asp Leu Arg Ala	
210 215 220	
Thr Gly Ala Asp Phe Ile Thr Cys Ser Gly Ser Lys Phe Gln Cys Gly	
225 230 235 240	
Pro Leu Gly Thr Gly Leu Ile Tyr Val Arg Asn Lys Val Val Pro Glu	

				245					250					255			
His	Asn	Pro	Leu	Pro	Leu	Pro	Thr	Phe	Trp	Pro	Leu	Ile	Ser	Thr	Trp		
			260					265					270				
Tyr	Pro	Met	Met	Gly	Ser	Pro	Pro	Pro	Arg	Thr	Ser	Thr	Ala	Val	Glu		
		275					280					285					
Ser	Tyr	Asn	Met	Gly	Asp	Phe	Leu	Gln	Ser	Ala	Gly	Ser	Ala	Asn	Leu		
	290				295						300						
Ala	Arg	Gly	Ala	Ala	Leu	Ala	Arg	Ala	Phe	Glu	Leu	Trp	Asp	Asp	Ile		
305				310						315					320		
Gly	Arg	Asp	Arg	Ile	Glu	Ala	Tyr	Ile	Met	Asp	Leu	Ala	Glu	Tyr	Ala		
			325					330						335			
Arg	Gly	Arg	Leu	Ile	Asp	Ala	Phe	Gly	Val	Glu	Ala	Met	Tyr	Ser	Pro		
			340					345					350				
Gly	Ala	Asp	Pro	Arg	Leu	Arg	Ser	Pro	Leu	Leu	Ala	Phe	Asn	Pro	Phe		
		355					360					365					
Arg	Arg	Pro	Glu	Asp	Ala	Trp	Asn	Ile	Lys	Lys	Phe	Ile	Gly	Phe	Val		
	370				375						380						
Lys	Arg	Leu	Glu	Thr	Glu	His	Arg	Ile	Trp	Thr	Arg	Trp	Thr	Glu	Phe		
385				390						395					400		
Asp	Val	Pro	Gly	Ser	Pro	His	Gln	His	Tyr	Ala	Ala	Arg	Ile	Thr	Thr		
			405					410						415			
His	Leu	Phe	Asn	Thr	Arg	Glu	Glu	Ile	Asp	His	Thr	Val	Arg	Thr	Met		
		420						425					430				
Val	Arg	Leu	Ala	Glu	Glu	Met	Ser										
		435				440											

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 <213> Bacteria

<220>
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Val	Thr	Gln	Ala	Arg	Ser	Ala	Thr	Thr	Thr	Asn	Asp	Thr	Arg	Leu	Arg	
1				5					10					15		
ggc acc ctg cgg ctg ctc ggg ccc gcc gcc gtc cac cag gcg gac ccg																96
Gly	Thr	Leu	Arg	Leu	Leu	Gly	Pro	Ala	Ala	Val	His	Gln	Ala	Asp	Pro	
			20					25					30			
gcc gcc gcc tgg tgc ccg gcc gag cgc cag ttg ctg cgg ctg tgc acc																144
Ala	Ala	Ala	Trp	Ser	Pro	Ala	Glu	Arg	Gln	Leu	Leu	Arg	Leu	Cys	Thr	
			35				40					45				
cgg cag ctg atc agc tac cgc ccg gaa ccc gac ccg ggc gac tgg cgc																192
Arg	Gln	Leu	Ile	Ser	Tyr	Arg	Pro	Glu	Pro	Asp	Pro	Gly	Asp	Trp	Arg	
		50				55				60						
gcc ctc gcg ccg gtc gcc gac ctg gcc acc gac gtc ccc tgc acc tac																240
Ala	Leu	Ala	Pro	Val	Ala	Asp	Leu	Ala	Thr	Asp	Val	Pro	Ser	Thr	Tyr	
	65				70				75					80		
aac gcc ggc ctg ggc gcc agc cac cgc agc tac gtg gtg cac ctg cgc																288

Asn	Ala	Gly	Leu	Gly	Ala	Ser	His	Arg	Ser	Tyr	Val	Val	His	Leu	Arg		
				85					90					95			
ccc	ggg	gtg	ctc	tgg	gac	acg	ccg	acc	ccc	cgc	ccg	gtg	acg	gcg	cac	336	
Pro	Gly	Val	Leu	Trp	Asp	Thr	Pro	Thr	Pro	Arg	Pro	Val	Thr	Ala	His		
				100					105					110			
gac	gtc	gta	cgc	ggc	ttc	aag	cgg	ctg	gcc	aac	ccg	ctc	acc	cga	cac	384	
Asp	Val	Val	Arg	Gly	Phe	Lys	Arg	Leu	Ala	Asn	Pro	Leu	Thr	Arg	His		
				115					120					125			
ccc	gcg	ctg	gcg	tac	ttc	cgg	ggc	acc	ctg	cgg	ggc	atg	ggc	cgg	tac	432	
Pro	Ala	Leu	Ala	Tyr	Phe	Arg	Gly	Thr	Leu	Arg	Gly	Met	Gly	Arg	Tyr		
				130					135					140			
tgc	gac	gag	tac	gcg	gcg	gcg	gtc	gcc	ggc	cac	ccg	gtc	acc	gcg	gcg	480	
Cys	Asp	Glu	Tyr	Ala	Ala	Ala	Val	Ala	Gly	His	Pro	Val	Thr	Ala	Ala		
				145					150					155			160
ctg	ctc	gcc	ggc	ttc	cag	gac	gcc	cac	gag	atc	ccc	ggc	gtg	ttc	gcc	528	
Leu	Leu	Ala	Gly	Phe	Gln	Asp	Ala	His	Glu	Ile	Pro	Gly	Val	Phe	Ala		
				165					170					175			
gtc	gac	gac	gag	acg	gtg	gtc	ttc	gag	ctg	gac	cgt	ccg	gcg	ctg	gac	576	
Val	Asp	Asp	Glu	Thr	Val	Val	Phe	Glu	Leu	Asp	Arg	Pro	Ala	Leu	Asp		
				180					185					190			
ttc	gtc	gac	atg	ctg	gcg	cag	agc	ggc	gcc	tcc	ccg	gcc	ccg	gtg	gag	624	
Phe	Val	Asp	Met	Leu	Ala	Gln	Ser	Gly	Ala	Ser	Pro	Ala	Pro	Val	Glu		
				195					200					205			
tac	gac	gca	cac	ctg	ccg	gga	agc	gcc	ggc	ctg	cac	gag	cac	ctg	gtc	672	
Tyr	Asp	Ala	His	Leu	Pro	Gly	Ser	Ala	Gly	Leu	His	Glu	His	Leu	Val		
				210					215					220			
gcc	aac	ggc	ccg	tac	cgc	gtc	gtg	tcg	tgg	cgc	ccc	ggg	ggc	acc	atc	720	
Ala	Asn	Gly	Pro	Tyr	Arg	Val	Val	Ser	Trp	Arg	Pro	Gly	Gly	Thr	Ile		
				225					230					235			240
cgg	ctg	gag	ccg	aac	ccg	gcg	tgg	cgg	gcg	gag	acc	gac	ccg	atc	cgc	768	
Arg	Leu	Glu	Pro	Asn	Pro	Ala	Trp	Arg	Ala	Glu	Thr	Asp	Pro	Ile	Arg		
				245					250					255			
gag	cgg	cgg	ttc	gac	gcc	gtc	gag	ttc	cgc	gtc	gcc	atg	ggc	ggg	ccg	816	
Glu	Arg	Arg	Phe	Asp	Ala	Val	Glu	Phe	Arg	Val	Ala	Met	Gly	Gly	Pro		
				260					265					270			
cgc	gaa	ctg	gcc	gac	cgg	ctc	gcc	gcc	gac	gac	gcc	gac	ctg	ccg	tgg	864	
Arg	Glu	Leu	Ala	Asp	Arg	Leu	Ala	Ala	Asp	Asp	Ala	Asp	Leu	Pro	Trp		
				275					280					285			
ggc	gtg	ccg	atc	ggc	ccg	gtg	ccc	ggt	cag	cgg	ctc	gac	ccg	tgc	ctg	912	
Gly	Val	Pro	Ile	Gly	Pro	Val	Pro	Gly	Gln	Arg	Leu	Asp	Pro	Cys	Leu		
				290					295					300			
gtg	ttc	aac	ctg	cgc	gac	ccc	gcc	aac	ccg	gcc	gtc	gcc	gac	gcc	gcg	960	
Val	Phe	Asn	Leu	Arg	Asp	Pro	Ala	Asn									

gtg cgc cgg gtc gtc gcc ggg gcg gtc gac cgg gcg gcg ctg gtg cgc	1008
Val Arg Arg Val Val Ala Gly Ala Val Asp Arg Ala Ala Leu Val Arg	
325 330 335	
atc gcc cgg gcc gcc gac ccg tgg tcc gag gtc cgc gcc gcg cac acc	1056
Ile Ala Arg Ala Ala Asp Pro Trp Ser Glu Val Arg Ala Ala His Thr	
340 345 350	
gtc gtg ccg ccc ggc aac gac ggg cac cgg cag ccc gac ccg ctc acc	1104
Val Val Pro Pro Gly Asn Asp Gly His Arg Gln Pro Asp Pro Leu Thr	
355 360 365	
gac ccg att ccc gac gcc gac gcg gac ccg cgc gag cgg ctc gcc gcc	1152
Asp Pro Ile Pro Asp Ala Asp Ala Asp Pro Arg Glu Arg Leu Ala Ala	
370 375 380	
gcg ggg cac ccg gac ggg ctc acc ctg acc gcg gtg cac ccc gac acg	1200
Ala Gly His Pro Asp Gly Leu Thr Leu Thr Ala Val His Pro Asp Thr	
385 390 395 400	
gcc gag gac ctg gcg ctg gcc cgc tcg tgg gcg gcc gac ctc ggc gcc	1248
Ala Glu Asp Leu Ala Leu Ala Arg Ser Trp Ala Ala Asp Leu Gly Ala	
405 410 415	
gcc ggc atc gac gta cgc ctg gtc gcg ctc gac gac gcc aac cac cgg	1296
Ala Gly Ile Asp Val Arg Leu Val Ala Leu Asp Asp Ala Asn His Arg	
420 425 430	
gcc ctg ctc gcc gcc acg ggc gac gcg ccc ggc ctg cga tgg gac ctg	1344
Ala Leu Leu Ala Ala Thr Gly Asp Ala Pro Gly Leu Arg Trp Asp Leu	
435 440 445	
gcg acc gcc acg ttc acc gcg ccg tgg gcc tac ggc aac gcc cgg gtg	1392
Ala Thr Ala Thr Phe Thr Ala Pro Trp Ala Tyr Gly Asn Ala Arg Val	
450 455 460	
ttc ctg caa ccg ctg gtc ggc gag gga ccc ggc aac ccc ggc ggc tac	1440
Phe Leu Gln Pro Leu Val Gly Glu Gly Pro Gly Asn Pro Gly Gly Tyr	
465 470 475 480	
cgc gac ccc ggg gtt gac cgg gtg gtc gag cgc gcg ctg gac gcg gcc	1488
Arg Asp Pro Gly Val Asp Arg Val Val Glu Arg Ala Leu Asp Ala Ala	
485 490 495	
gac ccg cgc gag gcg gtc gcc ctg tgg cag gag gtg gag cgg cgg ctg	1536
Asp Pro Arg Glu Ala Val Ala Leu Trp Gln Glu Val Glu Arg Arg Leu	
500 505 510	
ctc gcc gac gcc gcg gtc gta ccc ctg ctg ttc cgg cgg gcc acg gac	1584
Leu Ala Asp Ala Ala Val Val Pro Leu Leu Phe Arg Arg Ala Thr Asp	
515 520 525	
gcc gcg ccg cgc ggg ccc cgg gtg cgg cgc gcg acc gcc ctg ccg gcg	1632
Ala Ala Pro Arg Gly Pro Arg Val Arg Arg Ala Thr Ala Leu Pro Ala	
530 535 540	
ctc gcc ggc ctg ccc gac ctc gcc gac gtg cgg ctc ggg gtg gac cgg	1680

Leu Ala Gly Leu Pro Asp Leu Ala Asp Val Arg Leu Gly Val Asp Arg
 545 550 555 560

tga
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1683

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 <211> 560
 <212> PRT
 <213> Bacteria

<400> 22
 Val Thr Gln Ala Arg Ser Ala Thr Thr Thr Asn Asp Thr Arg Leu Arg
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 Gly Thr Leu Arg Leu Leu Gly Pro Ala Ala Val His Gln Ala Asp Pro
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 Ala Ala Ala Trp Ser Pro Ala Glu Arg Gln Leu Leu Arg Leu Cys Thr
 35 40 45
 Arg Gln Leu Ile Ser Tyr Arg Pro Glu Pro Asp Pro Gly Asp Trp Arg
 50 55 60
 Ala Leu Ala Pro Val Ala Asp Leu Ala Thr Asp Val Pro Ser Thr Tyr
 65 70 75 80
 Asn Ala Gly Leu Gly Ala Ser His Arg Ser Tyr Val Val His Leu Arg
 85 90 95
 Pro Gly Val Leu Trp Asp Thr Pro Thr Pro Arg Pro Val Thr Ala His
 100 105 110
 Asp Val Val Arg Gly Phe Lys Arg Leu Ala Asn Pro Leu Thr Arg His
 115 120 125
 Pro Ala Leu Ala Tyr Phe Arg Gly Thr Leu Arg Gly Met Gly Arg Tyr
 130 135 140
 Cys Asp Glu Tyr Ala Ala Ala Val Ala Gly His Pro Val Thr Ala Ala
 145 150 155 160
 Leu Leu Ala Gly Phe Gln Asp Ala His Glu Ile Pro Gly Val Phe Ala
 165 170 175
 Val Asp Asp Glu Thr Val Val Phe Glu Leu Asp Arg Pro Ala Leu Asp
 180 185 190
 Phe Val Asp Met Leu Ala Gln Ser Gly Ala Ser Pro Ala Pro Val Glu
 195 200 205
 Tyr Asp Ala His Leu Pro Gly Ser Ala Gly Leu His Glu His Leu Val
 210 215 220
 Ala Asn Gly Pro Tyr Arg Val Val Ser Trp Arg Pro Gly Gly Thr Ile
 225 230 235 240
 Arg Leu Glu Pro Asn Pro Ala Trp Arg Ala Glu Thr Asp Pro Ile Arg
 245 250 255
 Glu Arg Arg Phe Asp Ala Val Glu Phe Arg Val Ala Met Gly Gly Pro
 260 265 270
 Arg Glu Leu Ala Asp Arg Leu Ala Ala Asp Asp Ala Asp Leu Pro Trp
 275 280 285
 Gly Val Pro Ile Gly Pro Val Pro Gly Gln Arg Leu Asp Pro Cys Leu
 290 295 300
 Val Phe Asn Leu Arg Asp Pro Ala Asn Pro Ala Val Ala Asp Ala Ala
 305 310 315 320
 Val Arg Arg Val Val Ala Gly Ala Val Asp Arg Ala Ala Leu Val Arg
 325 330 335
 Ile Ala Arg Ala Ala Asp Pro Trp Ser Glu Val Arg Ala Ala His Thr
 340 345 350

Val Val Pro Pro Gly Asn Asp Gly His Arg Gln Pro Asp Pro Leu Thr
 355 360 365
 Asp Pro Ile Pro Asp Ala Asp Ala Asp Pro Arg Glu Arg Leu Ala Ala
 370 375 380
 Ala Gly His Pro Asp Gly Leu Thr Leu Thr Ala Val His Pro Asp Thr
 385 390 395 400
 Ala Glu Asp Leu Ala Leu Ala Arg Ser Trp Ala Ala Asp Leu Gly Ala
 405 410 415
 Ala Gly Ile Asp Val Arg Leu Val Ala Leu Asp Asp Ala Asn His Arg
 420 425 430
 Ala Leu Leu Ala Ala Thr Gly Asp Ala Pro Gly Leu Arg Trp Asp Leu
 435 440 445
 Ala Thr Ala Thr Phe Thr Ala Pro Trp Ala Tyr Gly Asn Ala Arg Val
 450 455 460
 Phe Leu Gln Pro Leu Val Gly Glu Gly Pro Gly Asn Pro Gly Gly Tyr
 465 470 475 480
 Arg Asp Pro Gly Val Asp Arg Val Val Glu Arg Ala Leu Asp Ala Ala
 485 490 495
 Asp Pro Arg Glu Ala Val Ala Leu Trp Gln Glu Val Glu Arg Arg Leu
 500 505 510
 Leu Ala Asp Ala Ala Val Val Pro Leu Leu Phe Arg Arg Ala Thr Asp
 515 520 525
 Ala Ala Pro Arg Gly Pro Arg Val Arg Arg Ala Thr Ala Leu Pro Ala
 530 535 540
 Leu Ala Gly Leu Pro Asp Leu Ala Asp Val Arg Leu Gly Val Asp Arg
 545 550 555 560

<210> 23
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 <213> Bacteria

<220>
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 <222> (1)...(1248)

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 Val Thr Gly Ala Ala Asp Ala Val Val Ala Asp Tyr Leu Ala Leu
 1 5 10 15

 ggg ctg cgg atg ggt cgg ctc gtc gag ggc tac gtc gac tgc tgg ttc 96
 Gly Leu Arg Met Gly Arg Leu Val Glu Gly Tyr Val Asp Cys Trp Phe
 20 25 30

 ggc gac cgg gcc ctc gcc gag cgg gtc gcc gcg gag ccg gcg ccg gac 144
 Gly Asp Arg Ala Leu Ala Glu Arg Val Ala Ala Glu Pro Ala Pro Asp
 35 40 45

 ccg gcg gag ctg gcc gga cag gcc cgc gac ctg ctg cgc cgc ctg ggc 192
 Pro Ala Glu Leu Ala Gly Gln Ala Arg Asp Leu Leu Arg Arg Leu Gly
 50 55 60

 gac gcg gac ctc gac gcg gag cgg cgg cgg ttc ctc gcc gcg cag ctg 240
 Asp Ala Asp Leu Asp Ala Glu Arg Arg Arg Phe Leu Ala Ala Gln Leu
 65 70 75 80

acc gcg gtg gag tgc gcg gcc cgg cgg gcg gcg ggt gag cag atc ggc	288
Thr Ala Val Glu Cys Ala Ala Arg Arg Ala Ala Gly Glu Gln Ile Gly	
85 90 95	
ttc ctg gcc gag gtg gag acc tac ttc gac gtc gag gtg cgc ctc ggc	336
Phe Leu Ala Glu Val Glu Thr Tyr Phe Asp Val Glu Val Arg Leu Gly	
100 105 110	
gac ccg gac cgg tac gcc gcc gcg cac gac gcc atc gac gcg ctg ctg	384
Asp Pro Asp Arg Tyr Ala Ala Ala His Asp Ala Ile Asp Ala Leu Leu	
115 120 125	
ccg ggc acc ggc cgg ctg atg gac aag gtc gag gcg ttc tac gcc cgc	432
Pro Gly Thr Gly Pro Leu Met Asp Lys Val Glu Ala Phe Tyr Ala Arg	
130 135 140	
aac gtg gtg ccg ccg gag cgg ctg ggc cac gcc gtg cgg gcc gtc gcc	480
Asn Val Val Pro Pro Glu Arg Leu Gly His Ala Val Arg Ala Val Ala	
145 150 155 160	
gac gcg ctg cgc gcc cgt gcc cgg ccg atg ctc ggg ctg ccc gag gcc	528
Asp Ala Leu Arg Ala Arg Ala Arg Pro Met Leu Gly Leu Pro Glu Ala	
165 170 175	
gag cgg gtc gac atc gag gtg gtc cgc gac cgg ccg tgg aac gcg ttc	576
Glu Arg Val Asp Ile Glu Val Val Arg Asp Arg Pro Trp Asn Ala Phe	
180 185 190	
aac cgg tac cac ggc ggc ttc cgt tcc acg gtg acg ctg aac gag acg	624
Asn Arg Tyr His Gly Gly Phe Arg Ser Thr Val Thr Leu Asn Glu Thr	
195 200 205	
gcc ggc cgg acc atc gcc gtg ctg ccg ctg atg gcc acc cac gag gcg	672
Ala Gly Arg Thr Ile Ala Val Leu Pro Leu Met Ala Thr His Glu Ala	
210 215 220	
tac ccg ggc cac cac acc gag cac tgc ctc aag gag gcc ggg ctg gtg	720
Tyr Pro Gly His His Thr Glu His Cys Leu Lys Glu Ala Gly Leu Val	
225 230 235 240	
ctc gac cgg ggc tgg gac gag cac cgc atc gcc ctg gtc aac acc ccg	768
Leu Asp Arg Gly Trp Asp Glu His Arg Ile Ala Leu Val Asn Thr Pro	
245 250 255	
cag tgc ctg gtg gcg gag ggc acc gcc gag cac gcc gcg gcg gcg ctg	816
Gln Cys Leu Val Ala Glu Gly Thr Ala Glu His Ala Ala Ala Ala Leu	
260 265 270	
ctc ggg ccc ggc tgg gga cgg tgg acc acc gag gtg ctg gcc ggc gag	864
Leu Gly Pro Gly Trp Gly Arg Trp Thr Thr Glu Val Leu Ala Gly Glu	
275 280 285	
ggg gtg ccc gtc gag ggc gac ctc gtc gag cgg atg gtg ggg ctc gtc	912
Gly Val Pro Val Glu Gly Asp Leu Val Glu Arg Met Val Gly Leu Val	
290 295 300	
aac gag ctg atg ccg gcc cgg cag gac gcg gcg atc ctg ctg cac gac	960
Asn Glu Leu Met Pro Ala Arg Gln Asp Ala Ala Ile Leu Leu His Asp	

305	310	315	320	
cgg ggg gcg tcg atc gac gac gcg gtg gag cac ctg cac cgg tgg ctg				1008
Arg Gly Ala Ser Ile Asp Asp Ala Val Glu His Leu His Arg Trp Leu	325	330	335	
ctg ctg ccg cgg gac cgg gcc gag cag atc gcc acc ttc ctg acc gac				1056
Leu Leu Pro Arg Asp Arg Ala Glu Gln Ile Ala Thr Phe Leu Thr Asp	340	345	350	
ccg ctg tgg cgg gcc tac tcc gtg acg tac atc gag ggg gcc cgg ctg				1104
Pro Leu Trp Arg Ala Tyr Ser Val Thr Tyr Ile Glu Gly Ala Arg Leu	355	360	365	
gtc ggc ggg tgg ctc gcc gcc cgg ccg gcc ggc gag ccg ctc gtc gcg				1152
Val Gly Gly Trp Leu Ala Ala Arg Pro Ala Gly Glu Pro Leu Val Ala	370	375	380	
cgg tac cgc acc ctg ctg gcg gag cag ctc ctt ccc gcg cag ctc cgc				1200
Arg Tyr Arg Thr Leu Leu Ala Glu Gln Leu Leu Pro Ala Gln Leu Arg	385	390	395	400
gac ggc acg gtc ccc gcg ggc gcg ccg ccc gtg ccc gcg gcc cgc tga				1248
Asp Gly Thr Val Pro Ala Gly Ala Pro Val Pro Ala Ala Arg *	405	410	415	

<210> 24
 <211> 415
 <212> PRT
 <213> Bacteria

<400> 24
 Val Thr Gly Ala Ala Ala Asp Ala Val Val Ala Asp Tyr Leu Ala Leu
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 Gly Leu Arg Met Gly Arg Leu Val Glu Gly Tyr Val Asp Cys Trp Phe
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 Gly Asp Arg Ala Leu Ala Glu Arg Val Ala Ala Glu Pro Ala Pro Asp
 35 40 45
 Pro Ala Glu Leu Ala Gly Gln Ala Arg Asp Leu Leu Arg Arg Leu Gly
 50 55 60
 Asp Ala Asp Leu Asp Ala Glu Arg Arg Arg Phe Leu Ala Ala Gln Leu
 65 70 75 80
 Thr Ala Val Glu Cys Ala Ala Arg Arg Ala Ala Gly Glu Gln Ile Gly
 85 90 95
 Phe Leu Ala Glu Val Glu Thr Tyr Phe Asp Val Glu Val Arg Leu Gly
 100 105 110
 Asp Pro Asp Arg Tyr Ala Ala Ala His Asp Ala Ile Asp Ala Leu Leu
 115 120 125
 Pro Gly Thr Gly Pro Leu Met Asp Lys Val Glu Ala Phe Tyr Ala Arg
 130 135 140
 Asn Val Val Pro Pro Glu Arg Leu Gly His Ala Val Arg Ala Val Ala
 145 150 155 160
 Asp Ala Leu Arg Ala Arg Ala Arg Pro Met Leu Gly Leu Pro Glu Ala
 165 170 175
 Glu Arg Val Asp Ile Glu Val Val Arg Asp Arg Pro Trp Asn Ala Phe
 180 185 190

Asn	Arg	Tyr	His	Gly	Gly	Phe	Arg	Ser	Thr	Val	Thr	Leu	Asn	Glu	Thr
	195						200					205			
Ala	Gly	Arg	Thr	Ile	Ala	Val	Leu	Pro	Leu	Met	Ala	Thr	His	Glu	Ala
	210						215				220				
Tyr	Pro	Gly	His	His	Thr	Glu	His	Cys	Leu	Lys	Glu	Ala	Gly	Leu	Val
	225				230					235					240
Leu	Asp	Arg	Gly	Trp	Asp	Glu	His	Arg	Ile	Ala	Leu	Val	Asn	Thr	Pro
			245						250					255	
Gln	Cys	Leu	Val	Ala	Glu	Gly	Thr	Ala	Glu	His	Ala	Ala	Ala	Ala	Leu
		260						265					270		
Leu	Gly	Pro	Gly	Trp	Gly	Arg	Trp	Thr	Thr	Glu	Val	Leu	Ala	Gly	Glu
	275						280					285			
Gly	Val	Pro	Val	Glu	Gly	Asp	Leu	Val	Glu	Arg	Met	Val	Gly	Leu	Val
	290					295					300				
Asn	Glu	Leu	Met	Pro	Ala	Arg	Gln	Asp	Ala	Ala	Ile	Leu	Leu	His	Asp
	305				310					315					320
Arg	Gly	Ala	Ser	Ile	Asp	Asp	Ala	Val	Glu	His	Leu	His	Arg	Trp	Leu
			325						330					335	
Leu	Leu	Pro	Arg	Asp	Arg	Ala	Glu	Gln	Ile	Ala	Thr	Phe	Leu	Thr	Asp
		340						345					350		
Pro	Leu	Trp	Arg	Ala	Tyr	Ser	Val	Thr	Tyr	Ile	Glu	Gly	Ala	Arg	Leu
	355						360					365			
Val	Gly	Gly	Trp	Leu	Ala	Ala	Arg	Pro	Ala	Gly	Glu	Pro	Leu	Val	Ala
	370					375					380				
Arg	Tyr	Arg	Thr	Leu	Leu	Ala	Glu	Gln	Leu	Leu	Pro	Ala	Gln	Leu	Arg
	385				390					395					400
Asp	Gly	Thr	Val	Pro	Ala	Gly	Ala	Pro	Pro	Val	Pro	Ala	Ala	Arg	
			405						410					415	

<210> 25
 <211> 1194
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(1194)

<400> 25																
atg	gcc	cac	ctc	ctg	atc	gtc	aac	gtc	gcc	agc	cac	ggc	ctg	atc	ctg	48
Met	Ala	His	Leu	Leu	Ile	Val	Asn	Val	Ala	Ser	His	Gly	Leu	Ile	Leu	
1				5					10					15		
ccc acc ctc acc gtg gtc acc gag ctg gtc cgg cgc ggg cac cgg gtc															96	
Pro	Thr	Leu	Thr	Val	Val	Thr	Glu	Leu	Val	Arg	Arg	Gly	His	Arg	Val	
			20					25					30			
agc tac gtc acc gcc ggc ggg ttc gcg gag ccg gtc cgt gcc gcc ggc															144	
Ser	Tyr	Val	Thr	Ala	Gly	Gly	Phe	Ala	Glu	Pro	Val	Arg	Ala	Ala	Gly	
		35				40						45				
gcg acg gtg gtg ccc tac cag tcg gag atc atc gac gcg gac gcc gcc															192	
Ala	Thr	Val	Val	Pro	Tyr	Gln	Ser	Glu	Ile	Ile	Asp	Ala	Asp	Ala	Ala	
		50				55					60					
gag gtg ttc ggc tcg gac gac ctc ggc gtc cgt ccc cac ctg atg tac															240	
Glu	Val	Phe	Gly	Ser	Asp	Asp	Leu	Gly	Val	Arg	Pro	His	Leu	Met	Tyr	

65	70	75	80	
ctg cgg gag aac gtc tgc gtg ctc cgg gcc acc gcc gag gcg ctc gac				288
Leu Arg Glu Asn Val Ser Val Leu Arg Ala Thr Ala Glu Ala Leu Asp	85	90	95	
ggc gac gtg ccg gac ctg gtc ctc tac gac gac ttc ccg ttc atc gcc				336
Gly Asp Val Pro Asp Leu Val Leu Tyr Asp Asp Phe Pro Phe Ile Ala	100	105	110	
ggg cag ttg ctg gcc gcc cgc tgg cgg cgg ccg gcc gtc cgg ctc agc				384
Gly Gln Leu Leu Ala Ala Arg Trp Arg Arg Pro Ala Val Arg Leu Ser	115	120	125	
gcg gcg ttc gcg tgc aac gag cac tac tgc ttc tcc cag gac atg gtc				432
Ala Ala Phe Ala Ser Asn Glu His Tyr Ser Phe Ser Gln Asp Met Val	130	135	140	
acc ctg gcc ggc acg atc gac ccg ctc gac ctg ccg gtg ttc cgc gac				480
Thr Leu Ala Gly Thr Ile Asp Pro Leu Asp Leu Pro Val Phe Arg Asp	145	150	155	160
acc ctg cgg gac ctg ctc gcc gag cac ggc ctg tcc cgg tgc gtc gtg				528
Thr Leu Arg Asp Leu Leu Ala Glu His Gly Leu Ser Arg Ser Val Val	165	170	175	
gac tgc tgg aac cac gtg gag caa ctc aac ctg gtc ttc gtc ccg aag				576
Asp Cys Trp Asn His Val Glu Gln Leu Asn Leu Val Phe Val Pro Lys	180	185	190	
gcg ttc cag atc gcc ggc gac acc ttc gac gac cgc ttc gtc ttc gtc				624
Ala Phe Gln Ile Ala Gly Asp Thr Phe Asp Asp Arg Phe Val Phe Val	195	200	205	
ggg ccg tgc ttc gac gac cgg cgg ttc ctc ggc gag tgg acc cgc ccg				672
Gly Pro Cys Phe Asp Asp Arg Arg Phe Leu Gly Glu Trp Thr Arg Pro	210	215	220	
gcc gac gac ctg ccg gtg gtg ctg gtg tgc ctc ggc acc acc ttc aac				720
Ala Asp Asp Leu Pro Val Val Leu Val Ser Leu Gly Thr Thr Phe Asn	225	230	235	240
gac cgg ccc gga ttc ttc cgc gac tgc gcg cgg gcg ttc gac ggc cag				768
Asp Arg Pro Gly Phe Phe Arg Asp Cys Ala Arg Ala Phe Asp Gly Gln	245	250	255	
ccg tgg cac gtg gtg atg acg ctg ggc ggc cag gtc gac ccg gcg gct				816
Pro Trp His Val Val Met Thr Leu Gly Gly Gln Val Asp Pro Ala Ala	260	265	270	
ctc ggc gac ctg ccc ccc aac gtg gag gcg cac cgc tgg gtc ccg cac				864
Leu Gly Asp Leu Pro Pro Asn Val Glu Ala His Arg Trp Val Pro His	275	280	285	
gtg aag gtg ctc gaa cag gcg acg gtc tgc gtg acg cac ggc ggc atg				912
Val Lys Val Leu Glu Gln Ala Thr Val Cys Val Thr His Gly Gly Met	290	295	300	

ggc acc ctc atg gag gcg ctc tac tgg ggg cgc ccg ctg gtg gtc gtg 960
 Gly Thr Leu Met Glu Ala Leu Tyr Trp Gly Arg Pro Leu Val Val Val
 305 310 315 320

 ccg cag tcc ttc gac gtg cag ccg atg gcc cgg cgg gtc gac cag ctc 1008
 Pro Gln Ser Phe Asp Val Gln Pro Met Ala Arg Arg Val Asp Gln Leu
 325 330 335

 ggc ctc ggc gcg gtg ctg ccc ggg gag aag gcc gac ggc gac acg ctg 1056
 Gly Leu Gly Ala Val Leu Pro Gly Glu Lys Ala Asp Gly Asp Thr Leu
 340 345 350

 ctc gcc gcc gtc ggg gcc gtc gcg gcc gac ccc gcg ctg ctc gcc cgg 1104
 Leu Ala Ala Val Gly Ala Val Ala Ala Asp Pro Ala Leu Leu Ala Arg
 355 360 365

 gtc gag gcc atg cgg ggc cac gtc cgc cgg gcc ggg ggc gcg gcc cgg 1152
 Val Glu Ala Met Arg Gly His Val Arg Arg Ala Gly Gly Ala Ala Arg
 370 375 380

 gcc gcc gac gcc gtg gag gcg tac ctg gcc cgc gcc cgc tga 1194
 Ala Ala Asp Ala Val Glu Ala Tyr Leu Ala Arg Ala Arg *
 385 390 395

<210> 26
 <211> 397
 <212> PRT
 <213> Bacteria

<400> 26
 Met Ala His Leu Leu Ile Val Asn Val Ala Ser His Gly Leu Ile Leu
 1 5 10 15
 Pro Thr Leu Thr Val Val Thr Glu Leu Val Arg Arg Gly His Arg Val
 20 25 30
 Ser Tyr Val Thr Ala Gly Gly Phe Ala Glu Pro Val Arg Ala Ala Gly
 35 40 45
 Ala Thr Val Val Pro Tyr Gln Ser Glu Ile Ile Asp Ala Asp Ala Ala
 50 55 60
 Glu Val Phe Gly Ser Asp Asp Leu Gly Val Arg Pro His Leu Met Tyr
 65 70 75 80
 Leu Arg Glu Asn Val Ser Val Leu Arg Ala Thr Ala Glu Ala Leu Asp
 85 90 95
 Gly Asp Val Pro Asp Leu Val Leu Tyr Asp Asp Phe Pro Phe Ile Ala
 100 105 110
 Gly Gln Leu Leu Ala Ala Arg Trp Arg Arg Pro Ala Val Arg Leu Ser
 115 120 125
 Ala Ala Phe Ala Ser Asn Glu His Tyr Ser Phe Ser Gln Asp Met Val
 130 135 140
 Thr Leu Ala Gly Thr Ile Asp Pro Leu Asp Leu Pro Val Phe Arg Asp
 145 150 155 160
 Thr Leu Arg Asp Leu Leu Ala Glu His Gly Leu Ser Arg Ser Val Val
 165 170 175
 Asp Cys Trp Asn His Val Glu Gln Leu Asn Leu Val Phe Val Pro Lys
 180 185 190
 Ala Phe Gln Ile Ala Gly Asp Thr Phe Asp Asp Arg Phe Val Phe Val
 195 200 205

Gly	Pro	Cys	Phe	Asp	Asp	Arg	Arg	Phe	Leu	Gly	Glu	Trp	Thr	Arg	Pro
210						215				220					
Ala	Asp	Asp	Leu	Pro	Val	Val	Leu	Val	Ser	Leu	Gly	Thr	Thr	Phe	Asn
225					230					235					240
Asp	Arg	Pro	Gly	Phe	Phe	Arg	Asp	Cys	Ala	Arg	Ala	Phe	Asp	Gly	Gln
			245					250						255	
Pro	Trp	His	Val	Val	Met	Thr	Leu	Gly	Gly	Gln	Val	Asp	Pro	Ala	Ala
		260						265					270		
Leu	Gly	Asp	Leu	Pro	Pro	Asn	Val	Glu	Ala	His	Arg	Trp	Val	Pro	His
	275					280						285			
Val	Lys	Val	Leu	Glu	Gln	Ala	Thr	Val	Cys	Val	Thr	His	Gly	Gly	Met
	290				295					300					
Gly	Thr	Leu	Met	Glu	Ala	Leu	Tyr	Trp	Gly	Arg	Pro	Leu	Val	Val	Val
305					310					315					320
Pro	Gln	Ser	Phe	Asp	Val	Gln	Pro	Met	Ala	Arg	Arg	Val	Asp	Gln	Leu
			325						330					335	
Gly	Leu	Gly	Ala	Val	Leu	Pro	Gly	Glu	Lys	Ala	Asp	Gly	Asp	Thr	Leu
			340					345					350		
Leu	Ala	Ala	Val	Gly	Ala	Val	Ala	Ala	Asp	Pro	Ala	Leu	Leu	Ala	Arg
		355					360					365			
Val	Glu	Ala	Met	Arg	Gly	His	Val	Arg	Arg	Ala	Gly	Gly	Ala	Ala	Arg
	370					375					380				
Ala	Ala	Asp	Ala	Val	Glu	Ala	Tyr	Leu	Ala	Arg	Ala	Arg			
385					390					395					

<210> 27
 <211> 993
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1) ... (993)

<400> 27																
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Val	Ser	Ser	Leu	His	Val	Arg	Leu	Gly	Arg	Thr	Gly	Leu	Arg	Val	Ser	
1				5				10						15		
cgg gtc gcc atc ggg acc gtc aac ttc ggc ggc cgg gtc gac gag gcc																96
Arg	Val	Ala	Ile	Gly	Thr	Val	Asn	Phe	Gly	Gly	Arg	Val	Asp	Glu	Ala	
			20					25					30			
gac gcc cac cgg ctg ctc gac cac gcc gtc gcg cag ggg gtc aac ctg																144
Asp	Ala	His	Arg	Leu	Leu	Asp	His	Ala	Val	Ala	Gln	Gly	Val	Asn	Leu	
			35				40					45				
gtc gac acc gcc gac atc tac ggc tgg cgg gtg cac cgg ggc tgg acc																192
Val	Asp	Thr	Ala	Asp	Ile	Tyr	Gly	Trp	Arg	Val	His	Arg	Gly	Trp	Thr	
			50			55					60					
gag gag atg atc ggg cgc tgg ctc gcc aag gac ccg gcc cgg cgg gac																240
Glu	Glu	Met	Ile	Gly	Arg	Trp	Leu	Ala	Lys	Asp	Pro	Ala	Arg	Arg	Asp	
			65			70				75					80	
gag gtg gtc ctc gcg acc aag gtc ggc aat ccc atg ggg gac ggc ccc																288
Glu	Val	Val	Leu	Ala	Thr	Lys	Val	Gly	Asn	Pro	Met	Gly	Asp	Gly	Pro	

85										90					95					
aac	gcc	cgg	ggc	ctg	tgc	gcc	cga	cac	gtc	gtc	gcc	gcc	tgc	gag	gcg	336				
Asn	Ala	Arg	Gly	Leu	Ser	Ala	Arg	His	Val	Val	Ala	Ala	Cys	Glu	Ala					
			100						105				110							
tgc	ctg	cgc	cgg	ctc	cag	acc	gac	gcc	atc	gac	ctc	tac	cag	atg	cac	384				
Ser	Leu	Arg	Arg	Leu	Gln	Thr	Asp	Ala	Ile	Asp	Leu	Tyr	Gln	Met	His					
			115						120				125							
cac	gtc	gac	cgg	gag	gtc	ggc	tgg	gac	gag	atc	tgg	cag	gcc	atg	gag	432				
His	Val	Asp	Arg	Glu	Val	Gly	Trp	Asp	Glu	Ile	Trp	Gln	Ala	Met	Glu					
			130				135					140								
cag	ctc	gtc	cgg	cag	ggc	aag	gtc	cgc	tac	gtc	ggg	tcc	tgc	aac	ttc	480				
Gln	Leu	Val	Arg	Gln	Gly	Lys	Val	Arg	Tyr	Val	Gly	Ser	Ser	Asn	Phe					
			145			150				155					160					
gcc	ggc	tgg	gac	ctg	gtg	agc	gcc	cag	gag	gcc	gcg	cgc	cgg	cac	cgg	528				
Ala	Gly	Trp	Asp	Leu	Val	Ser	Ala	Gln	Glu	Ala	Ala	Arg	Arg	His	Arg					
				165					170					175						
ctg	ctc	ggg	ctg	gcc	agc	gag	cag	tgc	gtc	tac	aac	ctg	gtc	agc	cgg	576				
Leu	Leu	Gly	Leu	Ala	Ser	Glu	Gln	Cys	Val	Tyr	Asn	Leu	Val	Ser	Arg					
			180					185					190							
tac	gtc	gaa	ctg	gag	gtg	ctc	ccc	gcc	gcc	gtc	gcc	gag	ggc	atc	ggg	624				
Tyr	Val	Glu	Leu	Glu	Val	Leu	Pro	Ala	Ala	Val	Ala	Glu	Gly	Ile	Gly					
			195				200					205								
gtg	ctc	gtc	tgg	tgc	ccg	ctg	cac	ggc	ggg	ctg	ctc	ggc	ggc	gtg	ctg	672				
Val	Leu	Val	Trp	Ser	Pro	Leu	His	Gly	Gly	Leu	Leu	Gly	Gly	Val	Leu					
			210			215					220									
cgg	aag	ctg	gcc	gac	ggc	acc	gcg	gtc	aag	tcc	gcg	cag	gga	cgg	gcc	720				
Arg	Lys	Leu	Ala	Asp	Gly	Thr	Ala	Val	Lys	Ser	Ala	Gln	Gly	Arg	Ala					
			225			230				235					240					
gcc	gag	gcg	gtc	gag	cgg	cac	cgc	gcg	aca	ctc	gcc	gcg	tac	gag	acg	768				
Ala	Glu	Ala	Val	Glu	Arg	His	Arg	Ala	Thr	Leu	Ala	Ala	Tyr	Glu	Thr					
				245					250					255						
ttc	tgc	gcc	gag	gcc	ggc	cgc	gac	ccg	gcg	gag	gtc	ggc	atg	gcc	tgg	816				
Phe	Cys	Ala	Glu	Ala	Gly	Arg	Asp	Pro	Ala	Glu	Val	Gly	Met	Ala	Trp					
			260					265					270							
gtg	ctg	cac	cgc	ccg	gcg	gtg	acc	gcc	gcg	gtc	gtc	ggg	ccg	cgt	acc	864				
Val	Leu	His	Arg	Pro	Ala	Val	Thr	Ala	Ala	Val	Val	Gly	Pro	Arg	Thr					
			275				280					285								
ccc	gaa	cac	ctg	gac	ggc	gcc	ctg	cgg	gcc	ctg	cac	cgg	ccg	ctg	tgc	912				
Pro	Glu	His	Leu	Asp	Gly	Ala	Leu	Arg	Ala	Leu	His	Arg	Pro	Leu	Ser					
			290			295					300									
gcg	gcg	gag	ctc	gcc	cgg	ctc	gac	gag	ctg	ttc	ccg	ccg	ctc	ggc	cgg	960				
Ala	Ala	Glu	Leu	Ala	Arg	Leu	Asp	Glu	Leu	Phe	Pro	Pro	Leu	Gly	Arg					
			305			310				315				320						

ggc ggc gcc gcc ccg gac gcc tgg atg tcc tga
 Gly Gly Ala Ala Pro Asp Ala Trp Met Ser *
 325 330

993

<210> 28
 <211> 330
 <212> PRT
 <213> Bacteria

<400> 28
 Val Ser Ser Leu His Val Arg Leu Gly Arg Thr Gly Leu Arg Val Ser
 1 5 10 15
 Arg Val Ala Ile Gly Thr Val Asn Phe Gly Gly Arg Val Asp Glu Ala
 20 25 30
 Asp Ala His Arg Leu Leu Asp His Ala Val Ala Gln Gly Val Asn Leu
 35 40 45
 Val Asp Thr Ala Asp Ile Tyr Gly Trp Arg Val His Arg Gly Trp Thr
 50 55 60
 Glu Glu Met Ile Gly Arg Trp Leu Ala Lys Asp Pro Ala Arg Arg Asp
 65 70 75 80
 Glu Val Val Leu Ala Thr Lys Val Gly Asn Pro Met Gly Asp Gly Pro
 85 90 95
 Asn Ala Arg Gly Leu Ser Ala Arg His Val Val Ala Ala Cys Glu Ala
 100 105 110
 Ser Leu Arg Arg Leu Gln Thr Asp Ala Ile Asp Leu Tyr Gln Met His
 115 120 125
 His Val Asp Arg Glu Val Gly Trp Asp Glu Ile Trp Gln Ala Met Glu
 130 135 140
 Gln Leu Val Arg Gln Gly Lys Val Arg Tyr Val Gly Ser Ser Asn Phe
 145 150 155 160
 Ala Gly Trp Asp Leu Val Ser Ala Gln Glu Ala Ala Arg Arg His Arg
 165 170 175
 Leu Leu Gly Leu Ala Ser Glu Gln Cys Val Tyr Asn Leu Val Ser Arg
 180 185 190
 Tyr Val Glu Leu Glu Val Leu Pro Ala Ala Val Ala Glu Gly Ile Gly
 195 200 205
 Val Leu Val Trp Ser Pro Leu His Gly Gly Leu Leu Gly Gly Val Leu
 210 215 220
 Arg Lys Leu Ala Asp Gly Thr Ala Val Lys Ser Ala Gln Gly Arg Ala
 225 230 235 240
 Ala Glu Ala Val Glu Arg His Arg Ala Thr Leu Ala Ala Tyr Glu Thr
 245 250 255
 Phe Cys Ala Glu Ala Gly Arg Asp Pro Ala Glu Val Gly Met Ala Trp
 260 265 270
 Val Leu His Arg Pro Ala Val Thr Ala Ala Val Val Gly Pro Arg Thr
 275 280 285
 Pro Glu His Leu Asp Gly Ala Leu Arg Ala Leu His Arg Pro Leu Ser
 290 295 300
 Ala Ala Glu Leu Ala Arg Leu Asp Glu Leu Phe Pro Pro Leu Gly Arg
 305 310 315 320
 Gly Gly Ala Ala Pro Asp Ala Trp Met Ser
 325 330

<210> 29
 <211> 543
 <212> DNA

<213> Bacteria

<220>

<221> CDS

<222> (1)...(543)

<400> 29

gga	tcc	cgg	cag	gga	tat	ggg	agg	atc	gcc	cac	cac	aac	atc	cac	ttt	48
Gly	Ser	Arg	Gln	Gly	Tyr	Gly	Arg	Ile	Ala	His	His	Asn	Ile	His	Phe	
1				5					10					15		

gga	cgg	tcc	tgg	aag	ggc	acc	ttc	gat	gag	gtc	atc	cgg	cgt	ggc	gag	96
Gly	Arg	Ser	Trp	Lys	Gly	Thr	Phe	Asp	Glu	Val	Ile	Arg	Arg	Gly	Glu	
			20					25					30			

ctg	atg	agc	gac	ccg	tcc	ctg	ctg	gtg	acc	aac	ccg	agc	cgg	acg	gac	144
Leu	Met	Ser	Asp	Pro	Ser	Leu	Leu	Val	Thr	Asn	Pro	Ser	Arg	Thr	Asp	
			35				40					45				

ccg	tcc	gtg	gcg	ccc	gcc	ggc	cgg	cac	acc	tac	tac	gtg	ctc	gcg	ccg	192
Pro	Ser	Val	Ala	Pro	Ala	Gly	Arg	His	Thr	Tyr	Tyr	Val	Leu	Ala	Pro	
		50				55					60					

gtg	ccc	aac	ctc	cac	cgg	gcg	ccg	ttc	gac	tgg	cgg	ggc	gac	ctc	acc	240
Val	Pro	Asn	Leu	His	Arg	Ala	Pro	Phe	Asp	Trp	Arg	Gly	Asp	Leu	Thr	
65					70					75				80		

gac	cgc	tac	gcc	gac	cag	ctc	gtc	ggg	acc	ctg	gag	gag	cgc	ggc	tac	288
Asp	Arg	Tyr	Ala	Asp	Gln	Leu	Val	Gly	Thr	Leu	Glu	Glu	Arg	Gly	Tyr	
				85					90					95		

gtc	ggc	ttc	ggc	gcc	ggc	gtc	gag	gtg	ctg	cgg	gcg	gtc	acc	ccg	gcc	336
Val	Gly	Phe	Gly	Ala	Gly	Val	Glu	Val	Leu	Arg	Ala	Val	Thr	Pro	Ala	
			100					105					110			

gag	tgg	gcg	gag	cag	ggg	atg	gcc	gcc	ggc	acc	ccg	ttc	gcc	gcc	gcg	384
Glu	Trp	Ala	Glu	Gln	Gly	Met	Ala	Ala	Gly	Thr	Pro	Phe	Ala	Ala	Ala	
		115					120					125				

cac	agc	ttc	ttc	cag	acc	ggc	ccg	ttc	cgc	ccg	tcg	aac	ctg	cac	cgg	432
His	Ser	Phe	Phe	Gln	Thr	Gly	Pro	Phe	Arg	Pro	Ser	Asn	Leu	His	Arg	
		130				135					140					

acg	ctg	ccg	aac	gtg	gtc	ttc	gtc	ggc	tcc	ggc	acc	cag	ccc	ggt	gtc	480
Thr	Leu	Pro	Asn	Val	Val	Phe	Val	Gly	Ser	Gly	Thr	Gln	Pro	Gly	Val	
145					150					155				160		

ggc	gtg	ccg	atg	gtg	ctc	atc	tcc	ggc	aag	ctc	gcc	gcc	ggc	cgc	atc	528
Gly	Val	Pro	Met	Val	Leu	Ile	Ser	Gly	Lys	Leu	Ala	Ala	Gly	Arg	Ile	
				165					170					175		

acc	ggg	aga	tcc	tga												543
Thr	Gly	Arg	Ser	*												
			180													

<210> 30

<211> 180

<212> PRT
<213> Bacteria

<400> 30
Gly Ser Arg Gln Gly Tyr Gly Arg Ile Ala His His Asn Ile His Phe
1 5 10 15
Gly Arg Ser Trp Lys Gly Thr Phe Asp Glu Val Ile Arg Arg Gly Glu
20 25 30
Leu Met Ser Asp Pro Ser Leu Leu Val Thr Asn Pro Ser Arg Thr Asp
35 40 45
Pro Ser Val Ala Pro Ala Gly Arg His Thr Tyr Tyr Val Leu Ala Pro
50 55 60
Val Pro Asn Leu His Arg Ala Pro Phe Asp Trp Arg Gly Asp Leu Thr
65 70 75 80
Asp Arg Tyr Ala Asp Gln Leu Val Gly Thr Leu Glu Glu Arg Gly Tyr
85 90 95
Val Gly Phe Gly Ala Gly Val Glu Val Leu Arg Ala Val Thr Pro Ala
100 105 110
Glu Trp Ala Glu Gln Gly Met Ala Ala Gly Thr Pro Phe Ala Ala Ala
115 120 125
His Ser Phe Phe Gln Thr Gly Pro Phe Arg Pro Ser Asn Leu His Arg
130 135 140
Thr Leu Pro Asn Val Val Phe Val Gly Ser Gly Thr Gln Pro Gly Val
145 150 155 160
Gly Val Pro Met Val Leu Ile Ser Gly Lys Leu Ala Ala Gly Arg Ile
165 170 175
Thr Gly Arg Ser
180

<210> 31
<211> 1362
<212> DNA
<213> Bacteria

<220>
<221> CDS
<222> (1)...(1362)

<400> 31
atg ccg ttc ctt ccc gac ccg ggc gaa ccg tcc ccg ctg aag gtg gtc 48
Met Pro Phe Leu Pro Asp Pro Gly Glu Pro Ser Pro Leu Lys Val Val
1 5 10 15
atc gcc ggc gcc ggc tac gtc ggc acc tgt ctc gcc gtc acc ctc gcc 96
Ile Ala Gly Ala Gly Tyr Val Gly Thr Cys Leu Ala Val Thr Leu Ala
20 25 30
ggc cgc ggc gcc gag gtg gtc gcg gtc gac agc gac ccg ggc acc gtc 144
Gly Arg Gly Ala Glu Val Val Ala Val Asp Ser Asp Pro Gly Thr Val
35 40 45
gcg gac ctg cgg gcc ggc cgg tgc cgg ctg ccc gag ccc ggc ctg gcc 192
Ala Asp Leu Arg Ala Gly Arg Cys Arg Leu Pro Glu Pro Gly Leu Ala
50 55 60
ggc gcc gtc cgg gac ctc gcc gcg acc gga cgg ctg acg gcg agc acg 240
Gly Ala Val Arg Asp Leu Ala Ala Thr Gly Arg Leu Thr Ala Ser Thr

65	70	75	80	
tcg tac gac ccg gtc ggc gcg gcg gac gtg gtg atc gtg acg gtc ggc				288
Ser Tyr Asp Pro Val Gly Ala Ala Asp Val Val Ile Val Thr Val Gly	85	90	95	
acc ccg acc gac gcc ggc cac gag atg gtc acc gac cag ctc gtc gcg				336
Thr Pro Thr Asp Ala Gly His Glu Met Val Thr Asp Gln Leu Val Ala	100	105	110	
gcg tgc gag cag atc gcc ccg cgg ctg cgc gcc ggg caa ctg gtg atc				384
Ala Cys Glu Gln Ile Ala Pro Arg Leu Arg Ala Gly Gln Leu Val Ile	115	120	125	
ctc aag tcg acg gtc tcc ccg ggc acc acc cgg acc ctc gtc gcg ccc				432
Leu Lys Ser Thr Val Ser Pro Gly Thr Thr Arg Thr Leu Val Ala Pro	130	135	140	
ctg ctg gag agc ggc ggg ctg gtg cac gag cgc gac ttc ggg ctg gcc				480
Leu Leu Glu Ser Gly Gly Leu Val His Glu Arg Asp Phe Gly Leu Ala	145	150	155	160
ttc tgc ccg gag cgg ctc gcc gag ggg gtg gcg ctg gcg cag gtg cgg				528
Phe Cys Pro Glu Arg Leu Ala Glu Gly Val Ala Leu Ala Gln Val Arg	165	170	175	
acg ctg ccg gtg gtg gtg ggt ggg tgc ggc ccg cgc agc gcc gcc gcg				576
Thr Leu Pro Val Val Val Gly Gly Cys Gly Pro Arg Ser Ala Ala Ala	180	185	190	
gcc gaa cgg ttc tgg cgg tcc gcg ctc ggc gtc gac gtc cgg cag gtg				624
Ala Glu Arg Phe Trp Arg Ser Ala Leu Gly Val Asp Val Arg Gln Val	195	200	205	
ccg tcg gcc gag tcc gcc gag gtg gtc aag ctc gcg acc aac tgg tgg				672
Pro Ser Ala Glu Ser Ala Glu Val Val Lys Leu Ala Thr Asn Trp Trp	210	215	220	
atc gac gcg aac gtg gcg atc gcc aac gaa ctc gcc cgg tac tgc gcg				720
Ile Asp Ala Asn Val Ala Ile Ala Asn Glu Leu Ala Arg Tyr Cys Ala	225	230	235	240
gtg ctg ggg gtg gac gtc ctc gac gtg atc ggc gcg gcg aac acc ctg				768
Val Leu Gly Val Asp Val Leu Asp Val Ile Gly Ala Ala Asn Thr Leu	245	250	255	
ccc aag ggc agc agc atg gtg aac ctg ctg ctg ccg ggg gtg ggt gtc				816
Pro Lys Gly Ser Ser Met Val Asn Leu Leu Leu Pro Gly Val Gly Val	260	265	270	
ggc ggc tcc tgc ctg acg aag gac ccg tgg atg gcg tgg cgg gac ggc				864
Gly Gly Ser Cys Leu Thr Lys Asp Pro Trp Met Ala Trp Arg Asp Gly	275	280	285	
cgg gac cgg ggc gtg ccc ctg cgc acg gtc gag acg gcc cgc gcg gtc				912
Arg Asp Arg Gly Val Pro Leu Arg Thr Val Glu Thr Ala Arg Ala Val	290	295	300	

aac gac gac atg ccc cgc cac acc gcc gcc gtc atc gcc gac gag ctg	960
Asn Asp Asp Met Pro Arg His Thr Ala Ala Val Ile Ala Asp Glu Leu	
305 310 315 320	
gtc aag ctg gga cgg gat cgg aac gac acg acg atc gcc gtg ctc ggc	1008
Val Lys Leu Gly Arg Asp Arg Asn Asp Thr Thr Ile Ala Val Leu Gly	
325 330 335	
gcg gcg ttc aag aac gac acc ggc gac gtc cgc aac acc ccg gtg cgc	1056
Ala Ala Phe Lys Asn Asp Thr Gly Asp Val Arg Asn Thr Pro Val Arg	
340 345 350	
ggg gtc gtg gcg gcg ctg cgc gac agc ggc ttc cgg gtc cgg atc ttc	1104
Gly Val Val Ala Ala Leu Arg Asp Ser Gly Phe Arg Val Arg Ile Phe	
355 360 365	
gac ccg ctg gcc gat ccc gcc gag atc gtc gcc cgg ttc ggc acc gcg	1152
Asp Pro Leu Ala Asp Pro Ala Glu Ile Val Ala Arg Phe Gly Thr Ala	
370 375 380	
ccg gcg gcg agc ctg gac gag gcg gtg agc ggg gcg ggc tgc ctg gcc	1200
Pro Ala Ala Ser Leu Asp Glu Ala Val Ser Gly Ala Gly Cys Leu Ala	
385 390 395 400	
ttc ctc gcc ggg cac cgc cag ttc cac gag ctc gac ttc ggc gcc ctg	1248
Phe Leu Ala Gly His Arg Gln Phe His Glu Leu Asp Phe Gly Ala Leu	
405 410 415	
gcc gag ccg gtg gac gag ccc tgc ctg gtc ttc gac ggc cgc atg cac	1296
Ala Glu Arg Val Asp Glu Pro Cys Leu Val Phe Asp Gly Arg Met His	
420 425 430	
ctc ccg ccg gcg cgc atc cgc gag ctg cac ccg ttc ggc ttc gcc tac	1344
Leu Pro Pro Ala Arg Ile Arg Glu Leu His Arg Phe Gly Phe Ala Tyr	
435 440 445	
cgc ggc att gga agg tga	1362
Arg Gly Ile Gly Arg *	
450	

<210> 32
 <211> 453
 <212> PRT
 <213> Bacteria

<400> 32
 Met Pro Phe Leu Pro Asp Pro Gly Glu Pro Ser Pro Leu Lys Val Val
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 Ile Ala Gly Ala Gly Tyr Val Gly Thr Cys Leu Ala Val Thr Leu Ala
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 Gly Arg Gly Ala Glu Val Val Ala Val Asp Ser Asp Pro Gly Thr Val
 35 40 45
 Ala Asp Leu Arg Ala Gly Arg Cys Arg Leu Pro Glu Pro Gly Leu Ala
 50 55 60
 Gly Ala Val Arg Asp Leu Ala Ala Thr Gly Arg Leu Thr Ala Ser Thr
 65 70 75 80
 Ser Tyr Asp Pro Val Gly Ala Ala Asp Val Val Ile Val Thr Val Gly

<400> 33

atg gag cag tcc cgg gag gcg gct gcg gcg cgg gcc atc gac tac atg	48
Met Glu Gln Ser Arg Glu Ala Ala Ala Ala Arg Ala Ile Asp Tyr Met	
1 5 10 15	
cgc cgg cac ctg tcg gag ccg ctg cag ctg gcc gac ctg gcc cgg gtt	96
Arg Arg His Leu Ser Glu Pro Leu Gln Leu Ala Asp Leu Ala Arg Val	
20 25 30	
gtc ccc ttc agc ccg ttc cac ttc cac cgg ctg ttc cgc gac gtg acc	144
Val Pro Phe Ser Pro Phe His Phe His Arg Leu Phe Arg Asp Val Thr	
35 40 45	
acg atg acc ccg gcc cgc ttc ctc gcc gcg ctg cgg atg gcg gag gcc	192
Thr Met Thr Pro Ala Arg Phe Leu Ala Ala Leu Arg Met Ala Glu Ala	
50 55 60	
cgc cgg atg ctg ctg cac tcc ggc ctg acg gtg acc gcg atc agc ggc	240
Arg Arg Met Leu Leu His Ser Gly Leu Thr Val Thr Ala Ile Ser Gly	
65 70 75 80	
cac gtc ggc tac acg agc gcg ggg acc ttc acc acc cag ttc tcc cgg	288
His Val Gly Tyr Thr Ser Ala Gly Thr Phe Thr Thr Gln Phe Ser Arg	
85 90 95	
ctg gtc ggc acg tcg ccg ggg cac ttc cgg cag atg tcc cgg ctg ctg	336
Leu Val Gly Thr Ser Pro Gly His Phe Arg Gln Met Ser Arg Leu Leu	
100 105 110	
gcc ggc cgg ccc tgc cac gtc ctg gcg ggc tgg ctg cgc aac gcc gtc	384
Ala Gly Arg Pro Cys His Val Leu Ala Gly Trp Leu Arg Asn Ala Val	
115 120 125	
acg gag gtc acc cga ccc cgg ctg gtg ctg cac gtg ccc gag agc gag	432
Thr Glu Val Thr Arg Pro Arg Leu Val Leu His Val Pro Glu Ser Glu	
130 135 140	
ccc ggc gac ctg gtg ctg gtc ggc ctg cgg gcc gac ggg gag gcc gcg	480
Pro Gly Asp Leu Val Leu Val Gly Leu Arg Ala Asp Gly Glu Ala Ala	
145 150 155 160	
gac gcg tcg acc acg tgg gcg gtg gcg gcc gac ggc gcg cag gtc ccg	528
Asp Ala Ser Thr Thr Trp Ala Val Ala Ala Asp Gly Ala Gln Val Pro	
165 170 175	
gtg gtg gcg cgg ccg ggc ccg tac cag gcc cgg gtc gtg ctg gtc cgg	576
Val Val Ala Arg Pro Gly Pro Tyr Gln Ala Arg Val Val Leu Val Arg	
180 185 190	
ggc gac agc acg ctg acc cgc gcc ctg gtg gac gag gag ccc acc agc	624
Gly Asp Ser Thr Leu Thr Arg Ala Leu Val Asp Glu Glu Pro Thr Ser	
195 200 205	
cat ctg gtc ggc acc gcc gaa ctg gtg ctg ccc cag gac ggc tgc gcg	672
His Leu Val Gly Thr Ala Glu Leu Val Leu Pro Gln Asp Gly Cys Ala	
210 215 220	
gcc gtc ccg gtc acc acc gcg ccg ccg cgg ccg acc gac ccg ccg gcg	720

Ala Val Pro Val Thr Thr Ala Pro Pro Arg Pro Thr Asp Pro Pro Ala
 225 230 235 240

ctg gcc ctc ggc ccg gtg tgc cgg ctc gtc gag acg ttc acg cgg ctg 768
 Leu Ala Leu Gly Pro Val Cys Arg Leu Val Glu Thr Phe Thr Arg Leu
 245 250 255

gcc ggc ccg tcg ggc cgg ccg ggt ccg gcc tgg tcg gcc ggc cgc acc 816
 Ala Gly Pro Ser Gly Arg Pro Gly Pro Ala Trp Ser Ala Gly Arg Thr
 260 265 270

gcg ctg gcc gcg gcg gcc atc gcg tga 843
 Ala Leu Ala Ala Ala Ala Ile Ala *
 275 280

<210> 34
 <211> 280
 <212> PRT
 <213> Bacteria

<400> 34
 Met Glu Gln Ser Arg Glu Ala Ala Ala Ala Arg Ala Ile Asp Tyr Met
 1 5 10 15
 Arg Arg His Leu Ser Glu Pro Leu Gln Leu Ala Asp Leu Ala Arg Val
 20 25 30
 Val Pro Phe Ser Pro Phe His Phe His Arg Leu Phe Arg Asp Val Thr
 35 40 45
 Thr Met Thr Pro Ala Arg Phe Leu Ala Ala Leu Arg Met Ala Glu Ala
 50 55 60
 Arg Arg Met Leu Leu His Ser Gly Leu Thr Val Thr Ala Ile Ser Gly
 65 70 75 80
 His Val Gly Tyr Thr Ser Ala Gly Thr Phe Thr Thr Gln Phe Ser Arg
 85 90 95
 Leu Val Gly Thr Ser Pro Gly His Phe Arg Gln Met Ser Arg Leu Leu
 100 105 110
 Ala Gly Arg Pro Cys His Val Leu Ala Gly Trp Leu Arg Asn Ala Val
 115 120 125
 Thr Glu Val Thr Arg Pro Arg Leu Val Leu His Val Pro Glu Ser Glu
 130 135 140
 Pro Gly Asp Leu Val Leu Val Gly Leu Arg Ala Asp Gly Glu Ala Ala
 145 150 155 160
 Asp Ala Ser Thr Thr Trp Ala Val Ala Ala Asp Gly Ala Gln Val Pro
 165 170 175
 Val Val Ala Arg Pro Gly Pro Tyr Gln Ala Arg Val Val Leu Val Arg
 180 185 190
 Gly Asp Ser Thr Leu Thr Arg Ala Leu Val Asp Glu Glu Pro Thr Ser
 195 200 205
 His Leu Val Gly Thr Ala Glu Leu Val Leu Pro Gln Asp Gly Cys Ala
 210 215 220
 Ala Val Pro Val Thr Thr Ala Pro Pro Arg Pro Thr Asp Pro Pro Ala
 225 230 235 240
 Leu Ala Leu Gly Pro Val Cys Arg Leu Val Glu Thr Phe Thr Arg Leu
 245 250 255
 Ala Gly Pro Ser Gly Arg Pro Gly Pro Ala Trp Ser Ala Gly Arg Thr
 260 265 270
 Ala Leu Ala Ala Ala Ala Ile Ala
 275 280

<210> 35
 <211> 1209
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(1209)

<400> 35

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Val	Leu	Val	Asp	Ala	Val	Thr	Ala	Phe	Asp	Pro	Thr	Asp	Ala	Asp	Val	
1				5					10						15	
cgg	cgt	gac	ccc	tac	ccg	tcc	tac	cac	tgg	ctg	ctg	cgg	cac	gac	ccg	96
Arg	Arg	Asp	Pro	Tyr	Pro	Ser	Tyr	His	Trp	Leu	Leu	Arg	His	Asp	Pro	
			20					25						30		
gtg	cac	cgt	ggc	gcc	cac	cgg	gtc	tgg	tac	gtc	tcc	cgc	ttc	gcg	gac	144
Val	His	Arg	Gly	Ala	His	Arg	Val	Trp	Tyr	Val	Ser	Arg	Phe	Ala	Asp	
			35				40					45				
gtg	cgc	gcg	gtg	ctc	ggc	gac	gag	cgc	ttc	gcc	cgg	acc	ggc	atc	cgc	192
Val	Arg	Ala	Val	Leu	Gly	Asp	Glu	Arg	Phe	Ala	Arg	Thr	Gly	Ile	Arg	
	50					55					60					
cgg	ttc	tgg	acc	gac	ctc	gtc	ggg	ccc	ggg	ctg	ctc	gcc	gag	atc	gtc	240
Arg	Phe	Trp	Thr	Asp	Leu	Val	Gly	Pro	Gly	Leu	Leu	Ala	Glu	Ile	Val	
	65				70				75						80	
ggc	gac	atc	atc	ctg	ttc	cag	gac	gag	ccc	gac	cac	ggc	cgg	ctg	cgc	288
Gly	Asp	Ile	Ile	Leu	Phe	Gln	Asp	Glu	Pro	Asp	His	Gly	Arg	Leu	Arg	
				85				90						95		
ggg	gtg	gtc	ggc	ccg	gcg	ttc	tcg	ccg	tcc	gcg	ctg	cgc	cgg	ctg	gaa	336
Gly	Val	Val	Gly	Pro	Ala	Phe	Ser	Pro	Ser	Ala	Leu	Arg	Arg	Leu	Glu	
			100					105					110			
ccg	gtg	atc	gcc	ggc	acc	gtg	gac	gac	ctg	ctg	cgg	ccc	gcc	ctg	gcc	384
Pro	Val	Ile	Ala	Gly	Thr	Val	Asp	Leu	Leu	Arg	Pro	Ala	Leu	Ala		
		115					120				125					
cgg	ggc	gcg	atg	gac	gtg	gtc	gac	gag	ctg	gcg	tac	ccg	ctg	gcg	ctg	432
Arg	Gly	Ala	Met	Asp	Val	Val	Asp	Glu	Leu	Ala	Tyr	Pro	Leu	Ala	Leu	
	130					135					140					
cgc	gcg	gtc	ctc	ggc	ctg	ctc	ggc	ctg	ccc	gcc	gcc	gac	tgg	ggg	gcg	480
Arg	Ala	Val	Leu	Gly	Leu	Leu	Gly	Leu	Pro	Ala	Ala	Asp	Trp	Gly	Ala	
	145				150				155					160		
gtc	ggg	cgc	tgg	tcg	cgc	gac	gtg	gga	cgg	acc	ctg	gac	cgg	ggc	gcc	528
Val	Gly	Arg	Trp	Ser	Arg	Asp	Val	Gly	Arg	Thr	Leu	Asp	Arg	Gly	Ala	
				165				170						175		
agc	gcc	gag	gac	atg	cgc	cgc	ggc	cac	gcg	gcg	atc	gcc	gag	ttc	gcc	576
Ser	Ala	Glu	Asp	Met	Arg	Arg	Gly	His	Ala	Ala	Ile	Ala	Glu	Phe	Ala	
			180				185						190			

gac tac gtg gag cgg gcc ctc gcg agg cgg cgg cgt gag ggc ggc gag	624
Asp Tyr Val Glu Arg Ala Leu Ala Arg Arg Arg Arg Glu Gly Gly Glu	
195 200 205	
gac ctg ctg gcg ttg atg ctc gac gcc cac gac cgc ggc ctg atg agt	672
Asp Leu Leu Ala Leu Met Leu Asp Ala His Asp Arg Gly Leu Met Ser	
210 215 220	
cgc aac gag atc gtc agc acg gtg gtc acg ttc atc ttc acc ggc cac	720
Arg Asn Glu Ile Val Ser Thr Val Val Thr Phe Ile Phe Thr Gly His	
225 230 235 240	
gag acg gtg gcc agc cag gtg ggc aac gcc gtg ctg agc ctg ctg gcg	768
Glu Thr Val Ala Ser Gln Val Gly Asn Ala Val Leu Ser Leu Leu Ala	
245 250 255	
cac ccg gac cag ctc gac ctg ctc cgg cgc cgg ccg gac ctg ctg gcc	816
His Pro Asp Gln Leu Asp Leu Leu Arg Arg Arg Pro Asp Leu Leu Ala	
260 265 270	
cag gcc gtc gag gag tgc ctg cgg tac gac ccg tcg gtg cag tcc aac	864
Gln Ala Val Glu Glu Cys Leu Arg Tyr Asp Pro Ser Val Gln Ser Asn	
275 280 285	
acc cgg cag ctc gac gtc gac gtg gag ctg cgc ggt cgg cgg ctg cgc	912
Thr Arg Gln Leu Asp Val Asp Val Glu Leu Arg Gly Arg Arg Leu Arg	
290 295 300	
cgc gac gac gtc gtg gtc gtc ctg gcc ggc gcg gcg aac cgg gac ccg	960
Arg Asp Asp Val Val Val Val Leu Ala Gly Ala Ala Asn Arg Asp Pro	
305 310 315 320	
cgg cgg tac gac cgg ccc gac gat ttc gac atc gag cgg gat ccg gtc	1008
Arg Arg Tyr Asp Arg Pro Asp Asp Phe Asp Ile Glu Arg Asp Pro Val	
325 330 335	
ccg tcg atg tcc ttc ggc gcg ggg atg cgc tac tgc ctc ggg tcc tac	1056
Pro Ser Met Ser Phe Gly Ala Gly Met Arg Tyr Cys Leu Gly Ser Tyr	
340 345 350	
ctc gcc cgt acg cag ctg cgc gcc gcg gtg gcc gcc ctg gcc cga ctg	1104
Leu Ala Arg Thr Gln Leu Arg Ala Ala Val Ala Ala Leu Ala Arg Leu	
355 360 365	
ccg ggc ctg cgg ctg ggc tgc gcg tcg gac gcc ctg gcc tat cag ccg	1152
Pro Gly Leu Arg Leu Gly Cys Ala Ser Asp Ala Leu Ala Tyr Gln Pro	
370 375 380	
cgc acc atg ttc cgg ggc ctg gcc agc ctg ccg atc gcg ttc acg ccg	1200
Arg Thr Met Phe Arg Gly Leu Ala Ser Leu Pro Ile Ala Phe Thr Pro	
385 390 395 400	
ggc ggt tga	1209
Gly Gly *	

<210> 36
 <211> 402
 <212> PRT
 <213> Bacteria

<400> 36

Val	Leu	Val	Asp	Ala	Val	Thr	Ala	Phe	Asp	Pro	Thr	Asp	Ala	Asp	Val
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Arg	Arg	Asp	Pro	Tyr	Pro	Ser	Tyr	His	Trp	Leu	Leu	Arg	His	Asp	Pro
			20					25					30		
Val	His	Arg	Gly	Ala	His	Arg	Val	Trp	Tyr	Val	Ser	Arg	Phe	Ala	Asp
		35					40					45			
Val	Arg	Ala	Val	Leu	Gly	Asp	Glu	Arg	Phe	Ala	Arg	Thr	Gly	Ile	Arg
	50					55					60				
Arg	Phe	Trp	Thr	Asp	Leu	Val	Gly	Pro	Gly	Leu	Leu	Ala	Glu	Ile	Val
65					70					75				80	
Gly	Asp	Ile	Ile	Leu	Phe	Gln	Asp	Glu	Pro	Asp	His	Gly	Arg	Leu	Arg
				85					90					95	
Gly	Val	Val	Gly	Pro	Ala	Phe	Ser	Pro	Ser	Ala	Leu	Arg	Arg	Leu	Glu
			100					105					110		
Pro	Val	Ile	Ala	Gly	Thr	Val	Asp	Asp	Leu	Leu	Arg	Pro	Ala	Leu	Ala
		115					120					125			
Arg	Gly	Ala	Met	Asp	Val	Val	Asp	Glu	Leu	Ala	Tyr	Pro	Leu	Ala	Leu
	130					135					140				
Arg	Ala	Val	Leu	Gly	Leu	Leu	Gly	Leu	Pro	Ala	Ala	Asp	Trp	Gly	Ala
145					150					155				160	
Val	Gly	Arg	Trp	Ser	Arg	Asp	Val	Gly	Arg	Thr	Leu	Asp	Arg	Gly	Ala
				165					170					175	
Ser	Ala	Glu	Asp	Met	Arg	Arg	Gly	His	Ala	Ala	Ile	Ala	Glu	Phe	Ala
			180					185					190		
Asp	Tyr	Val	Glu	Arg	Ala	Leu	Ala	Arg	Arg	Arg	Arg	Glu	Gly	Gly	Glu
	195						200					205			
Asp	Leu	Leu	Ala	Leu	Met	Leu	Asp	Ala	His	Asp	Arg	Gly	Leu	Met	Ser
	210					215					220				
Arg	Asn	Glu	Ile	Val	Ser	Thr	Val	Val	Thr	Phe	Ile	Phe	Thr	Gly	His
225					230					235				240	
Glu	Thr	Val	Ala	Ser	Gln	Val	Gly	Asn	Ala	Val	Leu	Ser	Leu	Leu	Ala
				245					250					255	
His	Pro	Asp	Gln	Leu	Asp	Leu	Leu	Arg	Arg	Pro	Asp	Leu	Leu	Ala	
			260					265				270			
Gln	Ala	Val	Glu	Glu	Cys	Leu	Arg	Tyr	Asp	Pro	Ser	Val	Gln	Ser	Asn
		275					280					285			
Thr	Arg	Gln	Leu	Asp	Val	Asp	Val	Glu	Leu	Arg	Gly	Arg	Arg	Leu	Arg
	290					295					300				
Arg	Asp	Asp	Val	Val	Val	Val	Leu	Ala	Gly	Ala	Ala	Asn	Arg	Asp	Pro
305					310					315				320	
Arg	Arg	Tyr	Asp	Arg	Pro	Asp	Asp	Phe	Asp	Ile	Glu	Arg	Asp	Pro	Val
				325					330					335	
Pro	Ser	Met	Ser	Phe	Gly	Ala	Gly	Met	Arg	Tyr	Cys	Leu	Gly	Ser	Tyr
			340					345					350		
Leu	Ala	Arg	Thr	Gln	Leu	Arg	Ala	Ala	Val	Ala	Ala	Leu	Ala	Arg	Leu
		355					360					365			
Pro	Gly	Leu	Arg	Leu	Gly	Cys	Ala	Ser	Asp	Ala	Leu	Ala	Tyr	Gln	Pro
	370					375					380				
Arg	Thr	Met	Phe	Arg	Gly	Leu	Ala	Ser	Leu	Pro	Ile	Ala	Phe	Thr	Pro
385					390					395				400	
Gly	Gly														

<210> 37
 <211> 1263
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(1263)

<400> 37

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Met Ser His Pro Glu Pro Glu Tyr Asp Val Ile Val Val Gly Gly Gly	
1 5 10 15	
ccg gcc gga tcg agc acg gcc ggt ctg ctc gcc cag gag ggc cac cgg	96
Pro Ala Gly Ser Ser Thr Ala Gly Leu Leu Ala Gln Glu Gly His Arg	
20 25 30	
gtc ctg ctg ctg gag cgc gag aag ttc ccc cgc tac cac atc ggc gag	144
Val Leu Leu Leu Glu Arg Glu Lys Phe Pro Arg Tyr His Ile Gly Glu	
35 40 45	
tcc ctg atc agc ggc gtc acc ctc acc ctg gac gcg ctc ggc gta cgc	192
Ser Leu Ile Ser Gly Val Thr Leu Thr Leu Asp Ala Leu Gly Val Arg	
50 55 60	
gag cgg atg gcg gag ctg cgc ttc cag atc aaa cac ggc ggc agc ctg	240
Glu Arg Met Ala Glu Leu Arg Phe Gln Ile Lys His Gly Gly Ser Leu	
65 70 75 80	
ctg tgg ggg gcc gat cag acc gcc ccg tgg tcg ttc cgg ttc cgg gag	288
Leu Trp Gly Ala Asp Gln Thr Ala Pro Trp Ser Phe Arg Phe Arg Glu	
85 90 95	
atc cgc gac gcc cgg ttc gac tac tcg tgg cag gtc cgg cgt gcc gaa	336
Ile Arg Asp Ala Arg Phe Asp Tyr Ser Trp Gln Val Arg Arg Ala Glu	
100 105 110	
ttc gac gcg atg ctg ctg gac cgg gcg cgg gaa ctg ggc gtg gtg gtg	384
Phe Asp Ala Met Leu Leu Asp Arg Ala Arg Glu Leu Gly Val Val Val	
115 120 125	
gtc gag gga gcc acc gtc cgg ggg ccg ctg acc gac ggc gag cgg gtc	432
Val Glu Gly Ala Thr Val Arg Gly Pro Leu Thr Asp Gly Glu Arg Val	
130 135 140	
gcg ggc gtc agc tac cag ttc cgg ggt gag gcc gac ccg atc gac gcc	480
Ala Gly Val Ser Tyr Gln Phe Arg Gly Glu Ala Asp Pro Ile Asp Ala	
145 150 155 160	
cgc gcc gcg atc gtg gtc gac gcg tcg ggg cag cag cgc tgg ctc ggc	528
Arg Ala Ala Ile Val Val Asp Ala Ser Gly Gln Gln Arg Trp Leu Gly	
165 170 175	
cgg cac ttc ggg ttg gtc tcc tgg cac gac gac ctg cgc aac atg gcg	576
Arg His Phe Gly Leu Val Ser Trp His Asp Asp Leu Arg Asn Met Ala	
180 185 190	

gcg tgg agc tac tac gcc ggg gcg ctg cgc tac ccc ggc gat cac gag	624
Ala Trp Ser Tyr Tyr Ala Gly Ala Leu Arg Tyr Pro Gly Asp His Glu	
195 200 205	
ggc gac ctg ctc gtc gag agc tgc gcc cag ggt tgg ctc tgg tac gcg	672
Gly Asp Leu Leu Val Glu Ser Cys Ala Gln Gly Trp Leu Trp Tyr Ala	
210 215 220	
ccg ctg agc ccc acc ctg acc ggg atc ggg tac gtc acc ccg tcg gac	720
Pro Leu Ser Pro Thr Leu Thr Gly Ile Gly Tyr Val Thr Pro Ser Asp	
225 230 235 240	
cgg ttc gcc gag acc ggc ctt ccc ccg gat cag ttg ctg gag aaa cag	768
Arg Phe Ala Glu Thr Gly Leu Pro Pro Asp Gln Leu Leu Glu Lys Gln	
245 250 255	
atc gcg gag tcg aac gag gtc tcc tgg ctc acc gcc ggc gcg cgg cgg	816
Ile Ala Glu Ser Asn Glu Val Ser Trp Leu Thr Ala Gly Ala Arg Arg	
260 265 270	
gtc gac gtc tac cgc acc gcg cgg gac tgg tcg tac gcg tgc agc cag	864
Val Asp Val Tyr Arg Thr Ala Arg Asp Trp Ser Tyr Ala Cys Ser Gln	
275 280 285	
ttc tcc ggg ccg ggc tgg gtg ctg gtc ggt gac gcc gcc gcc ttc atc	912
Phe Ser Gly Pro Gly Trp Val Leu Val Gly Asp Ala Ala Ala Phe Ile	
290 295 300	
gac ccc ctg ctg tcc tcc ggc gtg acg ctg gcg atg cgc ggc gcg ctc	960
Asp Pro Leu Leu Ser Ser Gly Val Thr Leu Ala Met Arg Gly Ala Leu	
305 310 315 320	
agc ctg tcc ccg gcg gtg cac gag gca ctg gcc gcg ccg gag aag gag	1008
Ser Leu Ser Arg Ala Val His Glu Ala Leu Ala Ala Pro Glu Lys Glu	
325 330 335	
cgc cat ctc atg cag gtg tac gag gac cgc tac ccg gac ttc ctc gcc	1056
Arg His Leu Met Gln Val Tyr Glu Asp Arg Tyr Arg Asp Phe Leu Ala	
340 345 350	
gcc ctg ctg gat ctg atc cgg ttc ttc tac gac ggc gcg cac ggc cgc	1104
Ala Leu Leu Asp Leu Ile Arg Phe Phe Tyr Asp Gly Ala His Gly Arg	
355 360 365	
gac gag ttg cac ctg cgc gcc cag gcc atc gtg gac ccg gac cgg ctg	1152
Asp Glu Leu His Leu Arg Ala Gln Ala Ile Val Asp Pro Asp Arg Leu	
370 375 380	
atg cct ccg aag atc tcg ttc gtc tcc ctg ctg tcg ggg ctg gcg cgg	1200
Met Pro Pro Lys Ile Ser Phe Val Ser Leu Leu Ser Gly Leu Ala Arg	
385 390 395 400	
ggc gac gag acg ctc gac cgc agc cct cgg acg gcc att gac cga ccg	1248
Gly Asp Glu Thr Leu Asp Arg Ser Pro Arg Thr Ala Ile Asp Arg Pro	
405 410 415	
tca gac gct ata taa	1263

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Met Pro Pro Lys Ile Ser Phe Val Ser Leu Leu Ser Gly Leu Ala Arg
 385 390 395 400
 Gly Asp Glu Thr Leu Asp Arg Ser Pro Arg Thr Ala Ile Asp Arg Pro
 405 410 415
 Ser Asp Ala Ile
 420

<210> 39
 <211> 1137
 <212> DNA
 <213> B

<220>
 <221> CDS
 <222> (1)...(1137)

<400> 39
 atg cgc gtg ctg ttc gtc tcc tcc ccc ggt atc ggc cac ctc ttc ccg 48
 Met Arg Val Leu Phe Val Ser Ser Pro Gly Ile Gly His Leu Phe Pro
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 ctg atc cag ctc gcc tgg ggc ttc cgc acg gcc ggc cac gac gtg ctg 96
 Leu Ile Gln Leu Ala Trp Gly Phe Arg Thr Ala Gly His Asp Val Leu
 20 25 30
 atc gcg gtc gcc gag cac gcc gac cgg gcc gcc gcc gcg ggc ctg gag 144
 Ile Ala Val Ala Glu His Ala Asp Arg Ala Ala Ala Ala Gly Leu Glu
 35 40 45
 gtc gtc gac gtg gcg ccc gac tac agc gcg gtc aag gtc ttc gag cag 192
 Val Val Asp Val Ala Pro Asp Tyr Ser Ala Val Lys Val Phe Glu Gln
 50 55 60
 gtg gcc aag gac aac ccg cgc ttc gcc gag acc gtc gcc acg cgt ccc 240
 Val Ala Lys Asp Asn Pro Arg Phe Ala Glu Thr Val Ala Thr Arg Pro
 65 70 75 80
 gcg atc gat ctg gag gag tgg ggc gtg cag atc gcg gcg gtg aac cgc 288
 Ala Ile Asp Leu Glu Trp Gly Val Gln Ile Ala Ala Val Asn Arg
 85 90 95
 ccg ctg gtc gac ggg acc atg gcg ctg gtc gac gac tac cgt ccc gac 336
 Pro Leu Val Asp Gly Thr Met Ala Leu Val Asp Asp Tyr Arg Pro Asp
 100 105 110
 ctg gtg gtc tac gag cag ggc gcc acc gtc ggc ctg ctg gcc gcc gac 384
 Leu Val Val Tyr Glu Gln Gly Ala Thr Val Gly Leu Leu Ala Ala Asp
 115 120 125
 cgc gcc ggg gtg ccg gca gtg cag cgc aac cag agc gcc tgg cgg acc 432
 Arg Ala Gly Val Pro Ala Val Gln Arg Asn Gln Ser Ala Trp Arg Thr
 130 135 140
 cgg gcc atg cac cgc tcg atc gcg tcc ttc ctg acc gac ctg atg gac 480
 Arg Gly Met His Arg Ser Ile Ala Ser Phe Leu Thr Asp Leu Met Asp
 145 150 155 160

aag cac cag gtc agc ctg ccc gag ccg gtg gcg acg atc gag tcg ttc	528
Lys His Gln Val Ser Leu Pro Glu Pro Val Ala Thr Ile Glu Ser Phe	
165 170 175	
ccg ccg agc ctg ctg ctg gag gcg gag ccc gag ggc tgg ttc atg cgc	576
Pro Pro Ser Leu Leu Leu Glu Ala Glu Pro Glu Gly Trp Phe Met Arg	
180 185 190	
tgg gtg ccg tac ggc ggc ggc gcc gtc ctc ggc gac cgg ctg ccg ccg	624
Trp Val Pro Tyr Gly Gly Gly Ala Val Leu Gly Asp Arg Leu Pro Pro	
195 200 205	
gtg ccc gcc cgg ccc gag gtg gcg atc acc atg ggc acc atc gag ctc	672
Val Pro Ala Arg Pro Glu Val Ala Ile Thr Met Gly Thr Ile Glu Leu	
210 215 220	
cag gcg ttc ggc atc ggc gcc gtg gag ccc atc atc gcc gcc gcc ggc	720
Gln Ala Phe Gly Ile Gly Ala Val Glu Pro Ile Ile Ala Ala Ala Gly	
225 230 235 240	
gag gtg gac gcc gac ttc gtg ctc gcc ctc ggc gac ctc gac atc agc	768
Glu Val Asp Ala Asp Phe Val Leu Ala Leu Gly Asp Leu Asp Ile Ser	
245 250 255	
ccg ctg ggc acg ttg ccg cgc aac gtc cgg gcg gtc ggc tgg acg ccg	816
Pro Leu Gly Thr Leu Pro Arg Asn Val Arg Ala Val Gly Trp Thr Pro	
260 265 270	
ctg cac acc ctg ctg cgt acc tgc acc gcg gtg gtg cac cac ggc ggc	864
Leu His Thr Leu Leu Arg Thr Cys Thr Ala Val Val His His Gly Gly	
275 280 285	
ggc ggc acg gtg atg acc gcc atc gac gcc ggc atc ccg cag ctg ctc	912
Gly Gly Thr Val Met Thr Ala Ile Asp Ala Gly Ile Pro Gln Leu Leu	
290 295 300	
gcc ccg gac ccg cgc gac cag ttc cag cac acc gcc cgg gag gcc gtc	960
Ala Pro Asp Pro Arg Asp Gln Phe Gln His Thr Ala Arg Glu Ala Val	
305 310 315 320	
agc cgg cgc ggc atc ggc ctg gtc agc acg tcg gac aag gtc gac gcg	1008
Ser Arg Arg Gly Ile Gly Leu Val Ser Thr Ser Asp Lys Val Asp Ala	
325 330 335	
gac ctg ctg cgc cgg ctg atc ggg gac gag tcg ctg cgc acc gcg gcc	1056
Asp Leu Leu Arg Arg Leu Ile Gly Asp Glu Ser Leu Arg Thr Ala Ala	
340 345 350	
cgg gag gta cgc gag gag atg gtc gcg ctg ccc acg ccg gcg gag acg	1104
Arg Glu Val Arg Glu Glu Met Val Ala Leu Pro Thr Pro Ala Glu Thr	
355 360 365	
gtg cgg cgc atc gtc gag cgc atc tcg ggt tga	1137
Val Arg Arg Ile Val Glu Arg Ile Ser Gly *	
370 375	

<210> 40

<211> 378
 <212> PRT
 <213> Bacteria

<400> 40

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Leu Ile Gln Leu Ala Trp Gly Phe Arg Thr Ala Gly His Asp Val Leu
20          25          30
Ile Ala Val Ala Glu His Ala Asp Arg Ala Ala Ala Ala Gly Leu Glu
35          40          45
Val Val Asp Val Ala Pro Asp Tyr Ser Ala Val Lys Val Phe Glu Gln
50          55          60
Val Ala Lys Asp Asn Pro Arg Phe Ala Glu Thr Val Ala Thr Arg Pro
65          70          75          80
Ala Ile Asp Leu Glu Glu Trp Gly Val Gln Ile Ala Ala Val Asn Arg
85          90          95
Pro Leu Val Asp Gly Thr Met Ala Leu Val Asp Asp Tyr Arg Pro Asp
100          105          110
Leu Val Val Tyr Glu Gln Gly Ala Thr Val Gly Leu Leu Ala Ala Asp
115          120          125
Arg Ala Gly Val Pro Ala Val Gln Arg Asn Gln Ser Ala Trp Arg Thr
130          135          140
Arg Gly Met His Arg Ser Ile Ala Ser Phe Leu Thr Asp Leu Met Asp
145          150          155          160
Lys His Gln Val Ser Leu Pro Glu Pro Val Ala Thr Ile Glu Ser Phe
165          170          175
Pro Pro Ser Leu Leu Leu Glu Ala Glu Pro Glu Gly Trp Phe Met Arg
180          185          190
Trp Val Pro Tyr Gly Gly Gly Ala Val Leu Gly Asp Arg Leu Pro Pro
195          200          205
Val Pro Ala Arg Pro Glu Val Ala Ile Thr Met Gly Thr Ile Glu Leu
210          215          220
Gln Ala Phe Gly Ile Gly Ala Val Glu Pro Ile Ile Ala Ala Ala Gly
225          230          235          240
Glu Val Asp Ala Asp Phe Val Leu Ala Leu Gly Asp Leu Asp Ile Ser
245          250          255
Pro Leu Gly Thr Leu Pro Arg Asn Val Arg Ala Val Gly Trp Thr Pro
260          265          270
Leu His Thr Leu Leu Arg Thr Cys Thr Ala Val Val His His Gly Gly
275          280          285
Gly Gly Thr Val Met Thr Ala Ile Asp Ala Gly Ile Pro Gln Leu Leu
290          295          300
Ala Pro Asp Pro Arg Asp Gln Phe Gln His Thr Ala Arg Glu Ala Val
305          310          315          320
Ser Arg Arg Gly Ile Gly Leu Val Ser Thr Ser Asp Lys Val Asp Ala
325          330          335
Asp Leu Leu Arg Arg Leu Ile Gly Asp Glu Ser Leu Arg Thr Ala Ala
340          345          350
Arg Glu Val Arg Glu Glu Met Val Ala Leu Pro Thr Pro Ala Glu Thr
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Val Arg Arg Ile Val Glu Arg Ile Ser Gly
370          375

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 <211> 1035
 <212> DNA

<213> Bacteria

<220>

<221> CDS

<222> (1)...(1035)

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gag acc gtc acc gtc gag gaa gcc gtc gcc cag ggc ctg tac ccg cag	96
Glu Thr Val Thr Val Glu Glu Ala Val Ala Gln Gly Leu Tyr Pro Gln	
20 25 30	
gag gac atc gag acg cac ggg ctg ggc ggg gcc gcg atc gcc ggc gaa	144
Glu Asp Ile Glu Thr His Gly Leu Gly Gly Ala Ala Ile Ala Gly Glu	
35 40 45	
ctg ccc gcg ccg gac atg gcg ctg cgg gcc gcg cag gac gcc ctc aag	192
Leu Pro Ala Pro Asp Met Ala Leu Arg Ala Ala Gln Asp Ala Leu Lys	
50 55 60	
gag agc gag ctg ggc cgc ggc gac atc gac ctg ctg ctc tac gcg gcc	240
Glu Ser Glu Leu Gly Arg Gly Asp Ile Asp Leu Leu Leu Tyr Ala Ala	
65 70 75 80	
gcc tgg cac cag ggc ccc gag ggc tgg ctg gcg cac tcc tac atc cag	288
Ala Trp His Gln Gly Pro Glu Gly Trp Leu Ala His Ser Tyr Ile Gln	
85 90 95	
cac tac ctg ctc ggc ggg gtg ccc cgg gcg acc gag atc cgg cag ggc	336
His Tyr Leu Leu Gly Gly Val Pro Arg Ala Thr Glu Ile Arg Gln Gly	
100 105 110	
tgc aac ggc atg ttc acc atg ctc gaa ctc gcg gcc agc tac ctg aag	384
Cys Asn Gly Met Phe Thr Met Leu Glu Leu Ala Ala Ser Tyr Leu Lys	
115 120 125	
gcc gcg ccg gaa cgc aag gcg gcg atg ctc gtc gcc gcc gac aac tac	432
Ala Ala Pro Glu Arg Lys Ala Ala Met Leu Val Ala Ala Asp Asn Tyr	
130 135 140	
ggc acc ccg ctg ctg gac cgc tgg cgc acc aac ctc ggc ttc atc ctc	480
Gly Thr Pro Leu Leu Asp Arg Trp Arg Thr Asn Leu Gly Phe Ile Leu	
145 150 155 160	
ggc gac gcc gcc tcc gcg gtg gtg ctg agc acc gag agc ggc ttc gtc	528
Gly Asp Ala Ala Ser Ala Val Val Leu Ser Thr Glu Ser Gly Phe Val	
165 170 175	
gag ctg atg tcg gtc tgc tcc atc acc gtg ccg gag gcc gag gag gtg	576
Glu Leu Met Ser Val Cys Ser Ile Thr Val Pro Glu Ala Glu Glu Val	
180 185 190	
cac cgc ggc ggc gag ccg atg ttc ccg ccc ggc gcg acg ctc gcc aag	624
His Arg Gly Gly Glu Pro Met Phe Pro Pro Gly Ala Thr Leu Ala Lys	
195 200 205	

gag ctc gac ttc ggc gcc cgg ctc ttc tac cac atc acc gag cag acc	672
Glu Leu Asp Phe Gly Ala Arg Leu Phe Tyr His Ile Thr Glu Gln Thr	
210 215 220	
ccc gtg ctc gcc gtg ctc ggc gag gcg cag gag acg atg acc acc gtc	720
Pro Val Leu Ala Val Leu Gly Glu Ala Gln Glu Thr Met Thr Thr Val	
225 230 235 240	
gcc gag cag gcg ctc gcc gag gcc ggc atc ggc acg gga gac ctg gcc	768
Ala Glu Gln Ala Leu Ala Glu Ala Gly Ile Gly Thr Gly Asp Leu Ala	
245 250 255	
aag gtc tcc ttc atg aac tac tcc cgc gag gtg gtc gag cag cgc tgc	816
Lys Val Ser Phe Met Asn Tyr Ser Arg Glu Val Val Glu Gln Arg Cys	
260 265 270	
atg gcg ccc ctg ggg ctg ggg atg gag aag tcc acc tgg gac ttc ggg	864
Met Ala Pro Leu Gly Leu Gly Met Glu Lys Ser Thr Trp Asp Phe Gly	
275 280 285	
cgg atg atc ggg cac tgc ggc gcc agc gac cac ctg ctc gcc ctg cac	912
Arg Met Ile Gly His Cys Gly Ala Ser Asp His Leu Leu Ala Leu His	
290 295 300	
cac tcg ctg cgg gcc ggt gag gtc gcc gcc ggc gac cac gtg ctg tgg	960
His Ser Leu Arg Ala Gly Glu Val Ala Ala Gly Asp His Val Leu Trp	
305 310 315 320	
ctg gcg atg ggc ccc ggc gtg gag ttc acc gcc gcc gtc ctg cgc gta	1008
Leu Ala Met Gly Pro Gly Val Glu Phe Thr Ala Ala Val Leu Arg Val	
325 330 335	
ctg gac aac ccc tac gtc gag cgc tga	1035
Leu Asp Asn Pro Tyr Val Glu Arg *	
340	

<210> 42
 <211> 344
 <212> PRT
 <213> Bacteria

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 Glu Thr Val Thr Val Glu Glu Ala Val Ala Gln Gly Leu Tyr Pro Gln
 20 25 30
 Glu Asp Ile Glu Thr His Gly Leu Gly Gly Ala Ala Ile Ala Gly Glu
 35 40 45
 Leu Pro Ala Pro Asp Met Ala Leu Arg Ala Ala Gln Asp Ala Leu Lys
 50 55 60
 Glu Ser Glu Leu Gly Arg Gly Asp Ile Asp Leu Leu Tyr Ala Ala
 65 70 75 80
 Ala Trp His Gln Gly Pro Glu Gly Trp Leu Ala His Ser Tyr Ile Gln
 85 90 95
 His Tyr Leu Leu Gly Gly Val Pro Arg Ala Thr Glu Ile Arg Gln Gly
 100 105 110

Cys	Asn	Gly	Met	Phe	Thr	Met	Leu	Glu	Leu	Ala	Ala	Ser	Tyr	Leu	Lys
		115					120					125			
Ala	Ala	Pro	Glu	Arg	Lys	Ala	Ala	Met	Leu	Val	Ala	Ala	Asp	Asn	Tyr
		130				135					140				
Gly	Thr	Pro	Leu	Leu	Asp	Arg	Trp	Arg	Thr	Asn	Leu	Gly	Phe	Ile	Leu
145					150					155					160
Gly	Asp	Ala	Ala	Ser	Ala	Val	Val	Leu	Ser	Thr	Glu	Ser	Gly	Phe	Val
				165					170					175	
Glu	Leu	Met	Ser	Val	Cys	Ser	Ile	Thr	Val	Pro	Glu	Ala	Glu	Glu	Val
		180						185					190		
His	Arg	Gly	Gly	Glu	Pro	Met	Phe	Pro	Pro	Gly	Ala	Thr	Leu	Ala	Lys
		195					200					205			
Glu	Leu	Asp	Phe	Gly	Ala	Arg	Leu	Phe	Tyr	His	Ile	Thr	Glu	Gln	Thr
		210			215						220				
Pro	Val	Leu	Ala	Val	Leu	Gly	Glu	Ala	Gln	Glu	Thr	Met	Thr	Thr	Val
225					230					235					240
Ala	Glu	Gln	Ala	Leu	Ala	Glu	Ala	Gly	Ile	Gly	Thr	Gly	Asp	Leu	Ala
				245					250					255	
Lys	Val	Ser	Phe	Met	Asn	Tyr	Ser	Arg	Glu	Val	Val	Glu	Gln	Arg	Cys
			260					265					270		
Met	Ala	Pro	Leu	Gly	Leu	Gly	Met	Glu	Lys	Ser	Thr	Trp	Asp	Phe	Gly
		275					280					285			
Arg	Met	Ile	Gly	His	Cys	Gly	Ala	Ser	Asp	His	Leu	Ala	Leu	His	
		290				295					300				
His	Ser	Leu	Arg	Ala	Gly	Glu	Val	Ala	Ala	Gly	Asp	His	Val	Leu	Trp
305					310					315					320
Leu	Ala	Met	Gly	Pro	Gly	Val	Glu	Phe	Thr	Ala	Ala	Val	Leu	Arg	Val
				325					330					335	
Leu	Asp	Asn	Pro	Tyr	Val	Glu	Arg								
			340												

<210> 43

<211> 1347

<212> DNA

<213> .

<220>

<221> CDS

<222> (1)...(1347)

<400> 43

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1				5					10				15			

ggg	cca	gcg	gtc	acg	ccc	ggg	cca	gcg	gtc	acg	ccc	ggg	ccg	ccg	gtc	96
Gly	Pro	Ala	Val	Thr	Pro	Gly	Pro	Ala	Val	Thr	Pro	Gly	Pro	Pro	Val	
			20					25				30				

acg	cca	ggg	cgg	gcg	gcg	gac	gga	ccg	gcc	gag	gcc	ggg	agc	gcg	gcc	144
Thr	Pro	Gly	Arg	Ala	Ala	Asp	Gly	Pro	Ala	Glu	Ala	Gly	Ser	Ala	Ala	
			35				40					45				

ggg	atc	gac	gcg	ttt	ccg	ctg	ccc	cgc	cgg	tgc	ccg	ttc	ggc	ccg	ccg	192
Gly	Ile	Asp	Ala	Phe	Pro	Leu	Pro	Arg	Arg	Cys	Pro	Phe	Gly	Pro	Pro	
	50						55				60					

gcc gag tac gcc cgg ctg cgg acc gag cgg ccg gtc gcc cgg ctg ccc	240
Ala Glu Tyr Ala Arg Leu Arg Thr Glu Arg Pro Val Ala Arg Leu Pro	
65 70 75 80	
atg ctc ggc ggc aac acg gcc tgg gtg gtg tcc cgg tac gcc gac gtc	288
Met Leu Gly Gly Asn Thr Ala Trp Val Val Ser Arg Tyr Ala Asp Val	
85 90 95	
aag cgg gtg ctc agc gac ccg cgg atg agc gcg gac cgg cgc cgg gcc	336
Lys Arg Val Leu Ser Asp Pro Arg Met Ser Ala Asp Arg Arg Ala	
100 105 110	
ggt ttt ccg cgg ttc gcg ccg acc acc gag agc cag cgg cag gcc tcg	384
Gly Phe Pro Arg Phe Ala Pro Thr Thr Glu Ser Gln Arg Gln Ala Ser	
115 120 125	
ttc gcg aac ttc cgc ccc ccg ctg aac tgg atg gac ccg ccg gag cac	432
Phe Ala Asn Phe Arg Pro Pro Leu Asn Trp Met Asp Pro Pro Glu His	
130 135 140	
acc gcc gcc cgc cgc cag atc gtc gac gag ttc gcc gcg cgg cgg gta	480
Thr Ala Ala Arg Arg Gln Ile Val Asp Glu Phe Ala Ala Arg Arg Val	
145 150 155 160	
cga cag ctg cgg ccg ctg gtc gag cgg gtg gtg gac gag cac ctc gac	528
Arg Gln Leu Arg Pro Leu Val Glu Arg Val Val Asp Glu His Leu Asp	
165 170 175	
gcc atg acg gcc ggg cgg tgc agc gcc gac ctg gtg ccg tgc ttc agc	576
Ala Met Thr Ala Gly Arg Ser Ser Ala Asp Leu Val Pro Ser Phe Ser	
180 185 190	
tat ccg gtg ccg tgc cgg gtg atc tgc gag atg ctc ggc gtg ccg tac	624
Tyr Pro Val Pro Ser Arg Val Ile Cys Glu Met Leu Gly Val Pro Tyr	
195 200 205	
ggc gaa cac gcg ttc ttc gag cgc cgg tcc acc cgg atg ctg agt cgc	672
Gly Glu His Ala Phe Phe Glu Arg Arg Ser Thr Arg Met Leu Ser Arg	
210 215 220	
ggc gtg ccc gcg gac gag cgg gcc cgg tgc gcc cgc gag atc cgc gag	720
Gly Val Pro Ala Asp Glu Arg Ala Arg Cys Ala Arg Glu Ile Arg Glu	
225 230 235 240	
ttc ctc gac ggc gtg gtg acc gac aag gag cgg cac ccc ggc gac gac	768
Phe Leu Asp Gly Val Val Thr Asp Lys Glu Arg His Pro Gly Asp Asp	
245 250 255	
gtg ctc agc cgg ctg ctc gcc gcg cag cgc gcg gcc ggc gag ccc gac	816
Val Leu Ser Arg Leu Leu Ala Ala Gln Arg Ala Ala Gly Glu Pro Asp	
260 265 270	
cac gag gcc gtg gtg agc atg gcc ttc gtg ctg ctg gtc gcc ggg cac	864
His Glu Ala Val Val Ser Met Ala Phe Val Leu Leu Val Ala Gly His	
275 280 285	
gtc acg acg tgc aac atg atc tgc ctg agc gtg ctg gcc ctg ttg acc	912
Val Thr Thr Ser Asn Met Ile Ser Leu Ser Val Leu Ala Leu Leu Thr	

$\mathbf{A} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

<400> 44

DC01 348871 v 1

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Met	Leu	Gly	Gly	Asn	Thr	Ala	Trp	Val	Val	Ser	Arg	Tyr	Ala	Asp Val
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Lys	Arg	Val	Leu	Ser	Asp	Pro	Arg	Met	Ser	Ala	Asp	Arg	Arg	Arg Ala
			100					105					110	
Gly	Phe	Pro	Arg	Phe	Ala	Pro	Thr	Thr	Glu	Ser	Gln	Arg	Gln	Ala Ser
			115				120					125		
Phe	Ala	Asn	Phe	Arg	Pro	Pro	Leu	Asn	Trp	Met	Asp	Pro	Pro	Glu His
			130			135					140			
Thr	Ala	Ala	Arg	Arg	Gln	Ile	Val	Asp	Glu	Phe	Ala	Ala	Arg	Arg Val
145					150					155				160
Arg	Gln	Leu	Arg	Pro	Leu	Val	Glu	Arg	Val	Val	Asp	Glu	His	Leu Asp
				165					170					175
Ala	Met	Thr	Ala	Gly	Arg	Ser	Ser	Ala	Asp	Leu	Val	Pro	Ser	Phe Ser
			180					185					190	
Tyr	Pro	Val	Pro	Ser	Arg	Val	Ile	Cys	Glu	Met	Leu	Gly	Val	Pro Tyr
			195				200					205		
Gly	Glu	His	Ala	Phe	Phe	Glu	Arg	Arg	Ser	Thr	Arg	Met	Leu	Ser Arg
			210			215					220			
Gly	Val	Pro	Ala	Asp	Glu	Arg	Ala	Arg	Cys	Ala	Arg	Glu	Ile	Arg Glu
225					230					235				240
Phe	Leu	Asp	Gly	Val	Val	Thr	Asp	Lys	Glu	Arg	His	Pro	Gly	Asp Asp
				245				250					255	
Val	Leu	Ser	Arg	Leu	Leu	Ala	Ala	Gln	Arg	Ala	Ala	Gly	Glu	Pro Asp
			260					265					270	
His	Glu	Ala	Val	Val	Ser	Met	Ala	Phe	Val	Leu	Leu	Val	Ala	Gly His
			275				280					285		
Val	Thr	Thr	Ser	Asn	Met	Ile	Ser	Leu	Ser	Val	Leu	Ala	Leu	Leu Thr
			290			295					300			
His	Pro	Glu	Arg	Leu	Ala	Arg	Leu	Arg	Ala	Glu	Pro	Asp	Arg	Phe Pro
305					310					315				320
Ala	Ala	Val	Glu	Glu	Leu	Leu	Arg	Tyr	Phe	Thr	Ile	Val	Glu	Ala Ala
				325					330					335
Thr	Ala	Arg	Thr	Ala	Thr	Ala	Asp	Val	Thr	Val	Gly	Gly	Val	Thr Ile
			340				345						350	
Arg	Ala	Gly	Glu	Gly	Val	Val	Ala	Leu	Gly	Gln	Ala	Ala	Asn	Arg Asp
		355					360				365			
Pro	Ala	Ala	Phe	Asp	Arg	Pro	Asp	Glu	Phe	Asp	Pro	Asp	Arg	Asp Ala
		370				375					380			
Arg	His	His	Leu	Ala	Phe	Gly	Tyr	Gly	Arg	His	Ile	Cys	Pro	Gly Gln
385					390					395				400
His	Leu	Ala	Arg	Leu	Glu	Leu	Asp	Val	Ala	Leu	Ser	Arg	Leu	Val Arg
				405				410					415	
Arg	Leu	Pro	Gly	Leu	Arg	Leu	Thr	Val	Asp	Val	Asp	Asp	Leu	Pro Leu
			420				425						430	
Lys	Glu	Asp	Gly	Asn	Ile	Phe	Gly	Leu	His	Ala	Leu	Pro	Val	Ala Trp
			435				440						445	

<210> 45
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 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(588)

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Thr Gly Thr Ala Pro Thr Thr Arg Ser Ala Thr Ala Pro Ala Gly Ser
20 25 30

tcc gca tcg tcg gcc ggc ggg tgc ggg cca gca acc gcg agg tgt ccc 144
Ser Ala Ser Ser Ala Gly Gly Cys Gly Pro Ala Thr Ala Arg Cys Pro
35 40 45

agt ggt gcc agc cgt tgc tgg cac cgt gcg gga cgg gtc tgg tgg cgt 192
Ser Gly Ala Ser Arg Cys Trp His Arg Ala Gly Arg Val Trp Trp Arg
50 55 60

tcg tcg tcc gac gca tcg acg gcg tgc tgc acg tgc tcg ccc acg ccg 240
Ser Ser Ser Asp Ala Ser Thr Ala Cys Cys Thr Cys Ser Pro Thr Pro
65 70 75 80

acc tgc ggc ccg gct acc ggg aca ccg tcg agc tgg gac cga ccg tgc 288
Thr Cys Gly Pro Ala Thr Gly Thr Pro Ser Ser Trp Asp Arg Pro Cys
85 90 95

agt gca ccc cgg gac aac ttc acc ggc ccg gcc cgg gac ggc cgc ccg 336
Ser Ala Pro Arg Asp Asn Phe Thr Gly Pro Ala Arg Asp Gly Arg Pro
100 105 110

gcg tac ctc gac ctg gtg ctc tcc gac gag gtc cgc gtg cac tac gac 384
Ala Tyr Leu Asp Leu Val Leu Ser Asp Glu Val Arg Val His Tyr Asp
115 120 125

gtg ctg cag tcg gag gag ggc ggg cgg ttc cac cac gcg gtg acc ccg 432
Val Leu Gln Ser Glu Glu Gly Gly Arg Phe His His Ala Val Thr Arg
130 135 140

cac atg gtg gtg gag gtg ggc ccg gac ttc ccc acc gcg aca ccg ccg 480
His Met Val Val Glu Val Gly Pro Asp Phe Pro Thr Ala Thr Pro Pro
145 150 155 160

gac tac acc tgg ctg acc ctg cgc cag ttg acc gcc gtg gcg gcc ttc 528
Asp Tyr Thr Trp Leu Thr Leu Arg Gln Leu Thr Ala Val Ala Ala Phe
165 170 175

agc tat cag gtc aac atc gag gcg cgc agc ctc ctg ctc tgc ctg ccg 576
Ser Tyr Gln Val Asn Ile Glu Ala Arg Ser Leu Leu Leu Cys Leu Arg
180 185 190

gcg ctg ccg tga 588
Ala Leu Arg *
195

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<210> 46
<211> 195
<212> PRT
<213> Bacteria

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1. Introduction

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Met	Thr	Arg	Asp	Asp	Pro	Ala	Asp	Asn	Pro	Tyr	Gln	Val	Ala	Val	Ile	
1				5					10					15		
ggc	atc	ggt	tgc	cgg	ctg	ccc	agc	gac	gtc	gac	acc	ccg	gac	gcc	ctc	96
Gly	Ile	Gly	Cys	Arg	Leu	Pro	Ser	Asp	Val	Asp	Thr	Pro	Asp	Ala	Leu	
			20					25					30			
tgg	gag	ctg	cta	ctc	aag	ggc	ggc	cag	acc	gcc	ggc	gag	atc	ccg	gcg	144
Trp	Glu	Leu	Leu	Leu	Lys	Gly	Gly	Gln	Thr	Ala	Gly	Glu	Ile	Pro	Ala	
		35					40					45				
cag	cgc	tgg	cgc	gcc	tac	cgg	gag	cgc	ggc	ccc	gag	tac	gag	gcg	gtc	192
Gln	Arg	Trp	Arg	Ala	Tyr	Arg	Glu	Arg	Gly	Pro	Glu	Tyr	Glu	Ala	Val	
	50					55				60						
ctg	cgc	gac	acc	gtc	acc	gcc	ggc	agc	tac	ctg	cgt	gac	gtc	gcg	ggc	240
Leu	Arg	Asp	Thr	Val	Thr	Ala	Gly	Ser	Tyr	Leu	Arg	Asp	Val	Ala	Gly	
65					70				75						80	

ttc gac ccc gag ttc ttc ggc ctg tcg ccc cgg gag gcg gcc gag atg	288
Phe Asp Pro Glu Phe Phe Gly Leu Ser Pro Arg Glu Ala Ala Glu Met	
85 90 95	
gac ccg cag cag cgg atc ctg ctc gag gtc ggc tgg gag gcc ctg gag	336
Asp Pro Gln Gln Arg Ile Leu Leu Glu Val Gly Trp Glu Ala Leu Glu	
100 105 110	
cac gcc ggc ctg cca ccc acc cgg ctg gcc ggc acc gac acg ggc gtc	384
His Ala Gly Leu Pro Pro Thr Arg Leu Ala Gly Thr Asp Thr Gly Val	
115 120 125	
ttc gtc ggg gac agc acc acc gac tac ggc gac cgg ctg ctg gag gac	432
Phe Val Gly Asp Ser Thr Thr Asp Tyr Gly Asp Arg Leu Leu Glu Asp	
130 135 140	
ctg ccg acc gtc gag gcg tac acc ggg atc ggc gcg gcc acc tgc gcc	480
Leu Pro Thr Val Glu Ala Tyr Thr Gly Ile Gly Ala Ala Thr Cys Ala	
145 150 155 160	
ctg gcc aac cgc atc tcc tac gcg ctg gac ctg cac ggc ccg agc gtc	528
Leu Ala Asn Arg Ile Ser Tyr Ala Leu Asp Leu His Gly Pro Ser Val	
165 170 175	
gcc gag gac acg gtc tgc tcg gcg tcg ctg gtc gcg gtg cac ctg gcc	576
Ala Glu Asp Thr Val Cys Ser Ala Ser Leu Val Ala Val His Leu Ala	
180 185 190	
tgc cag agc ctg ctg	591
Cys Gln Ser Leu Leu	
195	

<210> 48
 <211> 197
 <212> PRT
 <213> Bacteria

<400> 48																	
Met Thr Arg Asp Asp Pro Ala Asp Asn Pro Tyr Gln Val Ala Val Ile																	
1 5 10 15																	
Gly Ile Gly Cys Arg Leu Pro Ser Asp Val Asp Thr Pro Asp Ala Leu																	
20 25 30																	
Trp Glu Leu Leu Leu Lys Gly Gly Gln Thr Ala Gly Glu Ile Pro Ala																	
35 40 45																	
Gln Arg Trp Arg Ala Tyr Arg Glu Arg Gly Pro Glu Tyr Glu Ala Val																	
50 55 60																	
Leu Arg Asp Thr Val Thr Ala Gly Ser Tyr Leu Arg Asp Val Ala Gly																	
65 70 75 80																	
Phe Asp Pro Glu Phe Phe Gly Leu Ser Pro Arg Glu Ala Ala Glu Met																	
85 90 95																	
Asp Pro Gln Gln Arg Ile Leu Leu Glu Val Gly Trp Glu Ala Leu Glu																	
100 105 110																	
His Ala Gly Leu Pro Pro Thr Arg Leu Ala Gly Thr Asp Thr Gly Val																	
115 120 125																	
Phe Val Gly Asp Ser Thr Thr Asp Tyr Gly Asp Arg Leu Leu Glu Asp																	
130 135 140																	

Leu Pro Thr Val Glu Ala Tyr Thr Gly Ile Gly Ala Ala Thr Cys Ala
 145 150 155 160
 Leu Ala Asn Arg Ile Ser Tyr Ala Leu Asp Leu His Gly Pro Ser Val
 165 170 175
 Ala Glu Asp Thr Val Cys Ser Ala Ser Leu Val Ala Val His Leu Ala
 180 185 190
 Cys Gln Ser Leu Leu
 195

<210> 49
 <211> 618
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(618)

<400> 49
 atc ccc gag gag gcc ggg cag ctc agc atc gcg ggg gtg gcc gag ttg 48
 Ile Pro Glu Glu Ala Gly Gln Leu Ser Ile Ala Gly Val Ala Glu Leu
 1 5 10 15
 gtg gcc cgc cgc gcc gac ccg ccc gga cac acc gag aac agc gtg ctc 96
 Val Ala Arg Arg Ala Asp Pro Pro Gly His Thr Glu Asn Ser Val Leu
 20 25 30
 atc gcc gcg ccg ctg ccg ctg gtc tgg gac gtc acc aac gac gtg gcc 144
 Ile Ala Ala Pro Leu Pro Leu Val Trp Asp Val Thr Asn Asp Val Ala
 35 40 45
 ggc tgg ccc gag ctg ttc acc gag tac gcc cgg gcg gag atc ctg gac 192
 Gly Trp Pro Glu Leu Phe Thr Glu Tyr Ala Arg Ala Glu Ile Leu Asp
 50 55 60
 ggc gac ggc gac acc gtg cgg ttc cgg ctc acc atg cac ccc gac gag 240
 Gly Asp Gly Asp Thr Val Arg Phe Arg Leu Thr Met His Pro Asp Glu
 65 70 75 80
 aac ggg gtg gcg tgg agc tgg gtc agc gaa cgc acg gcc gac ccg gcc 288
 Asn Gly Val Ala Trp Ser Trp Val Ser Glu Arg Thr Ala Asp Pro Ala
 85 90 95
 acc cgg cag gtg cgc gcc cgg cgg gtg gag acc ggg ccg ttc gag tac 336
 Thr Arg Gln Val Arg Ala Arg Arg Val Glu Thr Gly Pro Phe Glu Tyr
 100 105 110
 atg cgc atc cac tgg cgc tac gcg gag gag ccc ggc ggc acg cgg atg 384
 Met Arg Ile His Trp Arg Tyr Ala Glu Glu Pro Gly Gly Thr Arg Met
 115 120 125
 acg tgg gtg cag gac ttc gcg atg aag ccg acc gcg ccg gtg gac aac 432
 Thr Trp Val Gln Asp Phe Ala Met Lys Pro Thr Ala Pro Val Asp Asn
 130 135 140
 gcc ggc atg acc gac cgg atc aac gcc aac agc gcc gtg cag ctc gcc 480
 Ala Gly Met Thr Asp Arg Ile Asn Ala Asn Ser Ala Val Gln Leu Ala

145 150 155 160
 gtc atc cgg gac aag atc gaa cgc ctg gcc cgc gag gga acg gct ggc 528
 Val Ile Arg Asp Lys Ile Glu Arg Leu Ala Arg Glu Gly Thr Ala Gly
 165 170 175
 ccg gcc ccc gcc gcc gcg gcc gcc acc acg ccc ggc ccg gcc ccg gcc 576
 Pro Ala Pro Ala Ala Ala Ala Ala Thr Thr Pro Gly Pro Ala Pro Ala
 180 185 190
 gcg cgc acc gcc gac gag gcg acg gga gcc ggc gat gag tga 618
 Ala Arg Thr Ala Asp Glu Ala Thr Gly Ala Gly Asp Glu *
 195 200 205

<210> 50
 <211> 205
 <212> PRT
 <213> Bacteria

<400> 50
 Ile Pro Glu Glu Ala Gly Gln Leu Ser Ile Ala Gly Val Ala Glu Leu
 1 5 10 15
 Val Ala Arg Arg Ala Asp Pro Pro Gly His Thr Glu Asn Ser Val Leu
 20 25 30
 Ile Ala Ala Pro Leu Pro Leu Val Trp Asp Val Thr Asn Asp Val Ala
 35 40 45
 Gly Trp Pro Glu Leu Phe Thr Glu Tyr Ala Arg Ala Glu Ile Leu Asp
 50 55 60
 Gly Asp Gly Asp Thr Val Arg Phe Arg Leu Thr Met His Pro Asp Glu
 65 70 75 80
 Asn Gly Val Ala Trp Ser Trp Val Ser Glu Arg Thr Ala Asp Pro Ala
 85 90 95
 Thr Arg Gln Val Arg Ala Arg Arg Val Glu Thr Gly Pro Phe Glu Tyr
 100 105 110
 Met Arg Ile His Trp Arg Tyr Ala Glu Glu Pro Gly Gly Thr Arg Met
 115 120 125
 Thr Trp Val Gln Asp Phe Ala Met Lys Pro Thr Ala Pro Val Asp Asn
 130 135 140
 Ala Gly Met Thr Asp Arg Ile Asn Ala Asn Ser Ala Val Gln Leu Ala
 145 150 155 160
 Val Ile Arg Asp Lys Ile Glu Arg Leu Ala Arg Glu Gly Thr Ala Gly
 165 170 175
 Pro Ala Pro Ala Ala Ala Ala Ala Thr Thr Pro Gly Pro Ala Pro Ala
 180 185 190
 Ala Arg Thr Ala Asp Glu Ala Thr Gly Ala Gly Asp Glu
 195 200 205

<210> 51
 <211> 405
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(405)

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<400> 51
atg agt gac cag acc ctg cgg ctg gtc gcc gcc gcc gcc gtc gcg ccg 48
Met Ser Asp Gln Thr Leu Arg Leu Val Ala Ala Ala Ala Val Ala Pro
1 5 10 15

gac agc cgc cgt ggc ggc gag ctg cgg gtg ctg ctc ggc ccg aag acc 96
Asp Ser Arg Arg Gly Gly Glu Leu Arg Val Leu Leu Gly Pro Lys Thr
20 25 30

gtc ggc agc acg tcc ggc ttc atg ggg gtg gcg acg ctg cgc ccg ggg 144
Val Gly Ser Thr Ser Gly Phe Met Gly Val Ala Thr Leu Arg Pro Gly
35 40 45

gag cgg atc gcc gag cac tac cat ccc tac agc gag gag ttc ctg tac 192
Glu Arg Ile Ala Glu His Tyr His Pro Tyr Ser Glu Glu Phe Leu Tyr
50 55 60

gtc gcc cgg ggc gcg atc acc gcc gac ctg gac gac gag ccg gtg ccg 240
Val Ala Arg Gly Ala Ile Thr Ala Asp Leu Asp Asp Glu Pro Val Pro
65 70 75 80

ctg gcc gcc ggg gag gcg ctg ttc gtg ccg cgc tac gtc cgg cac ccg 288
Leu Ala Ala Gly Glu Ala Leu Phe Val Pro Arg Tyr Val Arg His Arg
85 90 95

ctg cgc aac acc ggc gac gag ccg gcc gag gtg gtc ttc cac ctc ggt 336
Leu Arg Asn Thr Gly Asp Glu Pro Ala Glu Val Val Phe His Leu Gly
100 105 110

ccc ctc gcc ccc cgg ccc gaa ctc ggc cac gtc gac acc gag ctc gtc 384
Pro Leu Ala Pro Arg Pro Glu Leu Gly His Val Asp Thr Glu Leu Val
115 120 125

gag caa cgg ggc ggg tcg tga 405
Glu Gln Arg Gly Gly Ser *
130

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<210> 52
<211> 134
<212> PRT
<213> Bacteria

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<400> 52
Met Ser Asp Gln Thr Leu Arg Leu Val Ala Ala Ala Ala Val Ala Pro
1 5 10 15
Asp Ser Arg Arg Gly Gly Glu Leu Arg Val Leu Leu Gly Pro Lys Thr
20 25 30
Val Gly Ser Thr Ser Gly Phe Met Gly Val Ala Thr Leu Arg Pro Gly
35 40 45
Glu Arg Ile Ala Glu His Tyr His Pro Tyr Ser Glu Glu Phe Leu Tyr
50 55 60
Val Ala Arg Gly Ala Ile Thr Ala Asp Leu Asp Asp Glu Pro Val Pro
65 70 75 80
Leu Ala Ala Gly Glu Ala Leu Phe Val Pro Arg Tyr Val Arg His Arg
85 90 95
Leu Arg Asn Thr Gly Asp Glu Pro Ala Glu Val Val Phe His Leu Gly
100 105 110

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Pro Leu Ala Pro Arg Pro Glu Leu Gly His Val Asp Thr Glu Leu Val
115 120 125
Glu Gln Arg Gly Gly Ser
130

<210> 53
<211> 1137
<212> DNA
<213> Bacteria

<220>
<221> CDS
<222> (1)...(1137)

<400> 53
gtg acc ggg cgc cgc acg gtg gtg acc ggc gtc ggg gtg gtc gcc ccc 48
Val Thr Gly Arg Arg Thr Val Val Thr Gly Val Gly Val Val Ala Pro
1 5 10 15
ggc ggc gcc agc cgg gac cgg ttc tgg aag gcc atc acc gag ggg cgc 96
Gly Gly Ala Ser Arg Asp Arg Phe Trp Lys Ala Ile Thr Glu Gly Arg
20 25 30
acc gcg acc cgc cgg atc acc ttc ttc gac ccg tcc gcg ttc cgg tcg 144
Thr Ala Thr Arg Arg Ile Thr Phe Phe Asp Pro Ser Ala Phe Arg Ser
35 40 45
cag atc gcc gcc gag tgc gac ttc gac ccg gtc gcc gcc ggc ctc tcc 192
Gln Ile Ala Ala Glu Cys Asp Phe Asp Pro Val Ala Ala Gly Leu Ser
50 55 60
gag gcc gag cgg cgg cgc gcc gac cgg tac gtg cag ttc gcg ctc gcc 240
Glu Ala Glu Arg Arg Arg Ala Asp Arg Tyr Val Gln Phe Ala Leu Ala
65 70 75 80
tgc tcc gcc gag gcg gtc gcc gac gcc ggg ctg gag ctc acc gac gcc 288
Cys Ser Ala Glu Ala Val Ala Asp Ala Gly Leu Glu Leu Thr Asp Ala
85 90 95
gag cgg gac cgc gcc ggg gtg gtg ctc ggc acc gcc gtc ggc ggc acc 336
Glu Arg Asp Arg Ala Gly Val Val Leu Gly Thr Ala Val Gly Gly Thr
100 105 110
atg gcc ctg gag cag gag tac gtc acg gtc agc gac acc ggc cgc cgg 384
Met Ala Leu Glu Gln Glu Tyr Val Thr Val Ser Asp Thr Gly Arg Arg
115 120 125
tgg ctg gtc gac gcc gcg cgc ggc ggc ccg tac ctc tac cag gcg ctg 432
Trp Leu Val Asp Ala Ala Arg Gly Gly Pro Tyr Leu Tyr Gln Ala Leu
130 135 140
gtg ccg agc agc ctg gcc gcc gac gtg gcc tgc cgg cac ggg ctg cac 480
Val Pro Ser Ser Leu Ala Ala Asp Val Ala Cys Arg His Gly Leu His
145 150 155 160
ggc ccc gcg cag gtg gtc tcc acc ggc tgc acc tcg ggc atc gac gcc 528
Gly Pro Ala Gln Val Val Ser Thr Gly Cys Thr Ser Gly Ile Asp Ala

165								170				175				
atc	ggg	tac	gcc	cac	cag	ctc	atc	gcc	gac	ggc	gag	gcc	gac	atc	gtg	576
Ile	Gly	Tyr	Ala	His	Gln	Leu	Ile	Ala	Asp	Gly	Glu	Ala	Asp	Ile	Val	
			180						185				190			
ctg	gcc	ggg	gcg	gcg	gac	tcg	cct	atc	tcc	cgc	gtg	acc	gtc	gcg	tcc	624
Leu	Ala	Gly	Ala	Ala	Asp	Ser	Pro	Ile	Ser	Pro	Val	Thr	Val	Ala	Ser	
		195					200					205				
ttc	gac	gcg	atc	aag	gcg	acc	agt	ccc	gac	aac	gac	gat	ccg	gcg	cac	672
Phe	Asp	Ala	Ile	Lys	Ala	Thr	Ser	Pro	Asp	Asn	Asp	Asp	Pro	Ala	His	
	210					215					220					
gcc	tcc	cgc	ccg	ttc	gac	gcc	gac	cgg	cac	ggc	ttc	gtc	ctc	gcc	gag	720
Ala	Ser	Arg	Pro	Phe	Asp	Ala	Asp	Arg	His	Gly	Phe	Val	Leu	Ala	Glu	
225					230					235					240	
ggc	gcg	gcg	gtg	ctg	gtg	ctg	gag	gag	gcc	ggg	cac	gcc	cgg	cgg	cgc	768
Gly	Ala	Ala	Val	Leu	Val	Leu	Glu	Glu	Ala	Gly	His	Ala	Arg	Arg	Arg	
			245						250				255			
ggc	gcc	cac	gtc	tac	tgc	gag	gtc	gcc	ggc	tac	gcc	agc	cgc	agc	aac	816
Gly	Ala	His	Val	Tyr	Cys	Glu	Val	Ala	Gly	Tyr	Ala	Ser	Arg	Ser	Asn	
			260				265						270			
ggc	tac	cac	atg	acg	ggg	ctg	cgg	ccc	gac	ggg	ctg	gag	atg	ggg	ctg	864
Gly	Tyr	His	Met	Thr	Gly	Leu	Arg	Pro	Asp	Gly	Leu	Glu	Met	Gly	Leu	
		275					280					285				
gcc	atc	tcg	gcc	gcg	ctc	aag	cag	ggc	cgg	atc	gcc	ccc	gag	cag	gtc	912
Ala	Ile	Ser	Ala	Ala	Leu	Lys	Gln	Gly	Arg	Ile	gcc	Ala	Pro	Glu	Gln	
	290					295					300				Val	
tcc	tac	atc	agc	gcg	cac	ggt	tcc	ggc	acc	cgg	cag	aac	gac	cgg	cac	960
Ser	Tyr	Ile	Ser	Ala	His	Gly	Ser	Gly	Thr	Arg	Gln	Asn	Asp	Arg	His	
305					310					315					320	
gag	acc	gcc	gcg	ttc	aag	cgg	gcc	ctc	ggg	cag	gcc	gcg	tac	cgg	gtg	1008
Glu	Thr	Ala	Ala	Phe	Lys	Arg	Ala	Leu	Gly	Gln	Ala	Ala	Tyr	Arg	Val	
			325						330					335		
ccg	atc	agc	tcg	atc	aag	tcg	atg	gtc	ggg	cac	tcg	ctc	ggc	gcg	atc	1056
Pro	Ile	Ser	Ser	Ile	Lys	Ser	Met	Val	Gly	His	Ser	Leu	Gly	Ala	Ile	
			340				345						350			
ggc	tcg	atc	gag	atg	gcc	gcc	tgc	gcc	ctg	gcc	gtc	gag	ttc	ggc	gtg	1104
Gly	Ser	Ile	Glu	Met	Ala	Ala	Cys	Ala	Leu	Ala	Val	Glu	Phe	Gly	Val	
		355					360					365				
gtg	ccg	ccg	acg	gcc	aac	tgg	acc	acc	cgg	gat						

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<213> Bacteria

<400> 54

Val Thr Gly Arg Arg Thr Val Val Thr Gly Val Gly Val Val Ala Pro
1 5 10 15
Gly Gly Ala Ser Arg Asp Arg Phe Trp Lys Ala Ile Thr Glu Gly Arg
20 25 30
Thr Ala Thr Arg Arg Ile Thr Phe Phe Asp Pro Ser Ala Phe Arg Ser
35 40 45
Gln Ile Ala Ala Glu Cys Asp Phe Asp Pro Val Ala Ala Gly Leu Ser
50 55 60
Glu Ala Glu Arg Arg Arg Ala Asp Arg Tyr Val Gln Phe Ala Leu Ala
65 70 75 80
Cys Ser Ala Glu Ala Val Ala Asp Ala Gly Leu Glu Leu Thr Asp Ala
85 90 95
Glu Arg Asp Arg Ala Gly Val Val Leu Gly Thr Ala Val Gly Gly Thr
100 105 110
Met Ala Leu Glu Gln Glu Tyr Val Thr Val Ser Asp Thr Gly Arg Arg
115 120 125
Trp Leu Val Asp Ala Ala Arg Gly Gly Pro Tyr Leu Tyr Gln Ala Leu
130 135 140
Val Pro Ser Ser Leu Ala Ala Asp Val Ala Cys Arg His Gly Leu His
145 150 155 160
Gly Pro Ala Gln Val Val Ser Thr Gly Cys Thr Ser Gly Ile Asp Ala
165 170 175
Ile Gly Tyr Ala His Gln Leu Ile Ala Asp Gly Glu Ala Asp Ile Val
180 185 190
Leu Ala Gly Ala Ala Asp Ser Pro Ile Ser Pro Val Thr Val Ala Ser
195 200 205
Phe Asp Ala Ile Lys Ala Thr Ser Pro Asp Asn Asp Asp Pro Ala His
210 215 220
Ala Ser Arg Pro Phe Asp Ala Asp Arg His Gly Phe Val Leu Ala Glu
225 230 235 240
Gly Ala Ala Val Leu Val Leu Glu Glu Ala Gly His Ala Arg Arg Arg
245 250 255
Gly Ala His Val Tyr Cys Glu Val Ala Gly Tyr Ala Ser Arg Ser Asn
260 265 270
Gly Tyr His Met Thr Gly Leu Arg Pro Asp Gly Leu Glu Met Gly Leu
275 280 285
Ala Ile Ser Ala Ala Leu Lys Gln Gly Arg Ile Ala Pro Glu Gln Val
290 295 300
Ser Tyr Ile Ser Ala His Gly Ser Gly Thr Arg Gln Asn Asp Arg His
305 310 315 320
Glu Thr Ala Ala Phe Lys Arg Ala Leu Gly Gln Ala Ala Tyr Arg Val
325 330 335
Pro Ile Ser Ser Ile Lys Ser Met Val Gly His Ser Leu Gly Ala Ile
340 345 350
Gly Ser Ile Glu Met Ala Ala Cys Ala Leu Ala Val Glu Phe Gly Val
355 360 365
Val Pro Pro Thr Ala Asn Trp Thr Thr Arg Asp
370 375

<210> 55

<211> 969

<212> DNA

<213> Bacteria

<220>
 <221> CDS
 <222> (1)...(969)

<400> 55

atg ccc gcc aat tgg cga acc att cgt caa tac gcc ctg acg ccg ggg	48
Met Pro Ala Asn Trp Arg Thr Ile Arg Gln Tyr Ala Leu Thr Pro Gly	
1 5 10 15	
atg gcc cag acc acc ttc gcg acc cgg ggc ttc cgc gcc cgg gac gag	96
Met Ala Gln Thr Thr Phe Ala Thr Arg Gly Phe Arg Ala Arg Asp Glu	
20 25 30	
ccg acc cgc gag cgg ctg gag tgc gtc ggc gcc cac ttc ctc acc ggc	144
Pro Thr Arg Glu Arg Leu Glu Ser Val Gly Ala His Phe Leu Thr Gly	
35 40 45	
tac ggg cac gcc gtc ggc gcc cgg ggc ccg gac gag gcc gtc ggg gcg	192
Tyr Gly His Ala Val Gly Ala Arg Gly Pro Asp Glu Ala Val Gly Ala	
50 55 60	
ctg gag acc gtc gcg ccg gac ctg cgc ggg ttc gcg tac gag ggc gcg	240
Leu Glu Thr Val Ala Pro Asp Leu Arg Gly Phe Ala Tyr Glu Gly Ala	
65 70 75 80	
gcg atg ggc ctc gcc gtc ctg gac ggg ctg acc ggt ggc cgc cgg atc	288
Ala Met Gly Leu Ala Val Leu Asp Gly Leu Thr Gly Gly Arg Arg Ile	
85 90 95	
gcc cgg ttc ctg gcc ggg ccg gcc gcc cgg cac gtg tac atg gtc cat	336
Ala Arg Phe Leu Ala Gly Pro Ala Ala Arg His Val Tyr Met Val His	
100 105 110	
gtc ggg gtg ggc tgg gcg atg gcc cgc ctg ccc cgc tgg cgt cgg cac	384
Val Gly Val Gly Trp Ala Met Ala Arg Leu Pro Arg Trp Arg Arg His	
115 120 125	
gcg atc caa ccc gcc gac cgg ctg ctg ggc tgg ctg gcg ctg gac ggc	432
Ala Ile Gln Pro Ala Asp Arg Leu Leu Gly Trp Leu Ala Leu Asp Gly	
130 135 140	
tac gga ttc cac cag gcg tac ttc cac acc cgg cgg tac gtg tgg tgc	480
Tyr Gly Phe His Gln Ala Tyr Phe His Thr Arg Arg Tyr Val Trp Ser	
145 150 155 160	
cac cgg cgt gac gag gtg ctg ccc tgg ccc ggc gac ccg atc ggg cgg	528
His Arg Arg Asp Glu Val Leu Pro Trp Pro Gly Asp Pro Ile Gly Arg	
165 170 175	
tgg acc ggg cgc gtc gtg gac cag ggc atc ggc cgc gcg ctg tgg ttc	576
Trp Thr Gly Arg Val Val Asp Gln Gly Ile Gly Arg Ala Leu Trp Phe	
180 185 190	
gtc gag ggc gcc gac acc gac cgg atc gcc gac acc gtc gac ggc ttc	624
Val Glu Gly Ala Asp Thr Asp Arg Ile Ala Asp Thr Val Asp Gly Phe	
195 200 205	
ccg ccg gac cgg cac gag gac ctg tac agc ggg gtg gcg ctg gcc gcc	672

Pro	Pro	Asp	Arg	His	Glu	Asp	Leu	Tyr	Ser	Gly	Val	Ala	Leu	Ala	Ala		
210						215					220						
acg	tac	gcc	ggc	ggg	gcg	ccg	ccc	gag	gac	ctg	cgg	cgg	ctg	cgc	gag	720	
Thr	Tyr	Ala	Gly	Gly	Ala	Pro	Pro	Glu	Asp	Leu	Arg	Arg	Leu	Arg	Glu		
225					230					235					240		
cgc	ggc	gga	gcg	tac	gcc	ccg	gcg	atg	gcc	cag	ggc	agc	gcc	ttc	gcg	768	
Arg	Gly	Gly	Ala	Tyr	Ala	Pro	Ala	Met	Ala	Gln	Gly	Ser	Ala	Phe	Ala		
				245					250					255			
gcg	gag	gcc	cgg	gag	cgc	gcc	ggg	ctg	acc	acc	gcg	cac	acc	gcg	gtc	816	
Ala	Glu	Ala	Arg	Glu	Arg	Ala	Gly	Leu	Thr	Thr	Ala	His	Thr	Ala	Val		
			260					265					270				
gcc	acc	gac	gtc	ttc	tgc	ggc	gcg	cca	ccg	gcc	gag	gcg	gcg	gcg	gtc	864	
Ala	Thr	Asp	Val	Phe	Cys	Gly	Ala	Pro	Pro	Ala	Glu	Ala	Ala	Ala	Val		
		275					280					285					
acc	cag	gcc	gcg	ctg	gcc	gac	ctc	gac	cgg	gac	ggg	ccg	gag	ccg	gcc	912	
Thr	Gln	Ala	Ala	Leu	Ala	Asp	Leu	Asp	Arg	Asp	Gly	Pro	Glu	Pro	Ala		
	290					295					300						
tac	ctg	gtg	tgg	cgg	cag	cgg	atc	gcc	aag	cag	ttc	gtg	acg	ctg	ggg	960	
Tyr	Leu	Val	Trp	Arg	Gln	Arg	Ile	Ala	Lys	Gln	Phe	Val	Thr	Leu	Gly		
305					310					315					320		
agg	tgc	tga														969	
Arg	Cys	*															

<210> 56
 <211> 322
 <212> PRT
 <213> Bacteria

<400> 56
 Met Pro Ala Asn Trp Arg Thr Ile Arg Gln Tyr Ala Leu Thr Pro Gly
 1 5 10 15
 Met Ala Gln Thr Phe Ala Thr Arg Gly Phe Arg Ala Arg Asp Glu
 20 25 30
 Pro Thr Arg Glu Arg Leu Glu Ser Val Gly Ala His Phe Leu Thr Gly
 35 40 45
 Tyr Gly His Ala Val Gly Ala Arg Gly Pro Asp Glu Ala Val Gly Ala
 50 55 60
 Leu Glu Thr Val Ala Pro Asp Leu Arg Gly Phe Ala Tyr Glu Gly Ala
 65 70 75 80
 Ala Met Gly Leu Ala Val Leu Asp Gly Leu Thr Gly Gly Arg Arg Ile
 85 90 95
 Ala Arg Phe Leu Ala Gly Pro Ala Ala Arg His Val Tyr Met Val His
 100 105 110
 Val Gly Val Gly Trp Ala Met Ala Arg Leu Pro Arg Trp Arg Arg His
 115 120 125
 Ala Ile Gln Pro Ala Asp Arg Leu Leu Gly Trp Leu Ala Leu Asp Gly
 130 135 140
 Tyr Gly Phe His Gln Ala Tyr Phe His Thr Arg Arg Tyr Val Trp Ser
 145 150 155 160

His Arg Arg Asp Glu Val Leu Pro Trp Pro Gly Asp Pro Ile Gly Arg
 165 170 175
 Trp Thr Gly Arg Val Val Asp Gln Gly Ile Gly Arg Ala Leu Trp Phe
 180 185 190
 Val Glu Gly Ala Asp Thr Asp Arg Ile Ala Asp Thr Val Asp Gly Phe
 195 200 205
 Pro Pro Asp Arg His Glu Asp Leu Tyr Ser Gly Val Ala Leu Ala Ala
 210 215 220
 Thr Tyr Ala Gly Gly Ala Pro Pro Glu Asp Leu Arg Arg Leu Arg Glu
 225 230 235 240
 Arg Gly Gly Ala Tyr Ala Pro Ala Met Ala Gln Gly Ser Ala Phe Ala
 245 250 255
 Ala Glu Ala Arg Glu Arg Ala Gly Leu Thr Thr Ala His Thr Ala Val
 260 265 270
 Ala Thr Asp Val Phe Cys Gly Ala Pro Pro Ala Glu Ala Ala Ala Val
 275 280 285
 Thr Gln Ala Ala Leu Ala Asp Leu Asp Arg Asp Gly Pro Glu Pro Ala
 290 295 300
 Tyr Leu Val Trp Arg Gln Arg Ile Ala Lys Gln Phe Val Thr Leu Gly
 305 310 315 320
 Arg Cys

<210> 57
 <211> 1956
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(1956)

<400> 57
 atg ttc cgc cgg cag ttg gcc ggg ctg gtc gcg ctg gtg ctg ctc acc 48
 Met Phe Arg Arg Gln Leu Ala Gly Leu Val Ala Leu Val Leu Thr
 1 5 10 15
 ggc atg tac gtg ctg gtc cgg cag ccg gag gcg aac gcc gac gag cgg 96
 Gly Met Tyr Val Leu Val Arg Gln Pro Glu Ala Asn Ala Asp Glu Arg
 20 25 30
 cgc gcc atg gcg gag ccg tac cgg ttc acg ccg atg tcg ctg ccg atg 144
 Arg Ala Met Ala Glu Pro Tyr Arg Phe Thr Pro Met Ser Leu Pro Met
 35 40 45
 ccg ggc ggc ctg ccg cag cag tcg atc cgc cgg gtc aac gcc gcg tac 192
 Pro Gly Gly Leu Pro Gln Gln Ser Ile Arg Arg Val Asn Gly Ala Tyr
 50 55 60
 cag cac ctg gcg gcg tgg atc tcc tcc gtc ggc gcc ggc gcc gcg atg 240
 Gln His Leu Ala Ala Trp Ile Ser Ser Val Gly Ala Gly Ala Ala Met
 65 70 75 80
 aac gac ctg gac ggt gac gga ctg gcc aac gac ctg tgc gtc acc gac 288
 Asn Asp Leu Asp Gly Asp Gly Leu Ala Asn Asp Leu Cys Val Thr Asp
 85 90 95

[illegible]

325	330	335	
tca aag cgg ctc ggc cac gac tcg ttc aag ggc atg ggc gtg gac ttc			1056
Ser Lys Arg Leu Gly His Asp Ser Phe Lys Gly Met Gly Val Asp Phe			
340	345	350	
ggc gac atc gac ggc gac ggc atg ttc gac ctg tac gtc ggc aac atc			1104
Gly Asp Ile Asp Gly Asp Gly Met Phe Asp Leu Tyr Val Gly Asn Ile			
355	360	365	
acc acc tcc ttc ggc atc cag gag agc aac ttc gcc ttc gtc aac acc			1152
Thr Thr Ser Phe Gly Ile Gln Glu Ser Asn Phe Ala Phe Val Asn Thr			
370	375	380	
gcc gcc gac acc gcc gcg ctg cgc gcc gcg ctg tgg gcc ggc gag gcg			1200
Ala Ala Asp Thr Ala Ala Leu Arg Ala Ala Leu Trp Ala Gly Glu Ala			
385	390	395	400
ccg tgg cac gac cgc agc gcc gag ctg ggc ctg gcc tgg agc ggg tgg			1248
Pro Trp His Asp Arg Ser Ala Glu Leu Gly Leu Ala Trp Ser Gly Trp			
405	410	415	
agc tgg gac gtc aag ttc ggc gac ttc acc aac cgc ggc gac ccg gcg			1296
Ser Trp Asp Val Lys Phe Gly Asp Phe Thr Asn Arg Gly Asp Pro Ala			
420	425	430	
atc gtg cag acc tcc ggc ttc gtc aag ggc gag gtc aac cgc tgg gcg			1344
Ile Val Gln Thr Ser Gly Phe Val Lys Gly Glu Val Asn Arg Trp Ala			
435	440	445	
cag ttg cag gag gcg gcc acc gcc aac gac gac ctg ctc gcc aac ccc			1392
Gln Leu Gln Glu Ala Ala Thr Ala Asn Asp Asp Leu Leu Ala Asn Pro			
450	455	460	
cgc tgg tgg ccg aag gtc gag cag ggc gac gac atc gcc ggc ggc cag			1440
Arg Trp Trp Pro Lys Val Glu Gln Gly Asp Asp Ile Ala Gly Gly Gln			
465	470	475	480
cac ctc gcc ttc cac gtc cgg ggc gcc gac ggc cgc tac gag gac ctc			1488
His Leu Ala Phe His Val Arg Gly Ala Asp Gly Arg Tyr Glu Asp Leu			
485	490	495	
agc cac gaa ctg ggc ctg gcc gac cgg gtg ccc agc cgg ggc atc gcc			1536
Ser His Glu Leu Gly Leu Ala Asp Arg Val Pro Ser Arg Gly Ile Ala			
500	505	510	
acc gcc gac gcc gac ggc gac ggg cgc ctc gac ctc gtc gtc gcc cgg			1584
Thr Ala Asp Ala Asp Gly Asp Gly Arg Leu Asp Leu Val Val Ala Arg			
515	520	525	
cag tgg gac gcg ccg gtc ttc tac cgc aac gac agc ccg gac acc ggt			1632
Gln Trp Asp Ala Pro Val Phe Tyr Arg Asn Asp Ser Pro Asp Thr Gly			
530	535	540	
tcc ttc ctc acc ctg cgg ctg ctg cac gag cag gcg ccg gcc gcc ggc			1680
Ser Phe Leu Thr Leu Arg Leu Leu His Glu Gln Ala Pro Ala Ala Gly			
545	550	555	560

ccc ctc gcc ggg gcg ggg tcg ccg gtc gtc ggc gcg cag gtc egg gtg 1728
 Pro Leu Ala Gly Ala Gly Ser Pro Val Val Gly Ala Gln Val Arg Val
 565 570 575

acc acg ccg gac ggc cgg gtg ctc atc gac cgg gtc gac ggc ggc agc 1776
 Thr Thr Pro Asp Gly Arg Val Leu Ile Asp Arg Val Asp Gly Gly Ser
 580 585 590

ggc cac tcg ggc cgg cgc agc aac gag gtg tcg ctc ggt ctc gac gac 1824
 Gly His Ser Gly Arg Arg Ser Asn Glu Val Ser Leu Gly Leu Asp Asp
 595 600 605

gtg acc ggc ccg gtg tcg gtc cac ctc acc tgg cgg gac cgg tcc ggc 1872
 Val Thr Gly Pro Val Ser Val His Leu Thr Trp Arg Asp Arg Ser Gly
 610 615 620

gcc ccg cac gag cag gag ctg acg ctg gcc ccc ggt cga cac acc ctc 1920
 Ala Pro His Glu Gln Glu Leu Thr Leu Ala Pro Gly Arg His Thr Leu
 625 630 635 640

acc ctc ggt tcg cag gct cgg gag gtc tcg cga tga 1956
 Thr Leu Gly Ser Gln Ala Arg Glu Val Ser Arg *
 645 650

<210> 58
 <211> 651
 <212> PRT
 <213> Bacteria

<400> 58
 Met Phe Arg Arg Gln Leu Ala Gly Leu Val Ala Leu Val Leu Leu Thr
 1 5 10 15
 Gly Met Tyr Val Leu Val Arg Gln Pro Glu Ala Asn Ala Asp Glu Arg
 20 25 30
 Arg Ala Met Ala Glu Pro Tyr Arg Phe Thr Pro Met Ser Leu Pro Met
 35 40 45
 Pro Gly Gly Leu Pro Gln Gln Ser Ile Arg Arg Val Asn Gly Ala Tyr
 50 55 60
 Gln His Leu Ala Ala Trp Ile Ser Ser Val Gly Ala Gly Ala Ala Met
 65 70 75 80
 Asn Asp Leu Asp Gly Asp Gly Leu Ala Asn Asp Leu Cys Val Thr Asp
 85 90 95
 Pro Arg Val Asp Arg Val Val Val Thr Pro Ala Pro Thr Ala Gly Ala
 100 105 110
 Asp Arg Tyr Gln Pro Phe Val Leu Asp Pro Ala Pro Leu Pro Met Asn
 115 120 125
 Pro Tyr Val Ala Pro Met Gly Cys Leu Pro Gly Asp Leu Asn Ala Asp
 130 135 140
 Gly Arg Thr Asp Leu Leu Val Tyr Trp Trp Gly Arg Thr Pro Val Val
 145 150 155 160
 Phe Leu Ala Arg Ala Asp Ala Thr Gly Leu Ser Arg Ala Ala Tyr His
 165 170 175
 Pro Val Glu Leu Val Pro Gly Ala Ala Thr Gly Gly Ser Arg Tyr Asp
 180 185 190
 Gly Pro Lys Trp Asn Thr Asn Ala Ala Thr Leu Ala Asp Phe Asp Gly
 195 200 205
 Asp Gly His Leu Asp Val Tyr Ile Gly Asn Tyr Phe Pro Asp Ser Ala

210	Val	Leu	Asp	Asp	Thr	215	Val	His	Gly	Gly	Val	220	Ala	Met	Asn	Arg	Ser	Met
225						230					235							240
Ser	Asn	Gly	Leu	Asn	Gly	Gly	Glu	Asp	His	Val	Phe	Arg	Trp	Thr	Gly			
						245				250								255
Gly	Thr	Ala	Gly	Ala	Thr	Pro	Ser	Ala	Ser	Phe	Ala	Glu	Val	Pro	Asp			
						260				265								270
Val	Phe	Asp	Thr	Lys	Val	Ser	Arg	Gly	Trp	Thr	Leu	Ala	Val	Ala	Ala			
						275				280								285
Asn	Asp	Leu	Asp	Gly	Asp	Gln	Leu	Pro	Glu	Leu	Tyr	Val	Ala	Asn	Asp			
						290				295								300
Phe	Gly	Pro	Asp	Arg	Leu	Leu	His	Asn	Arg	Ser	Glu	Arg	Gly	Arg	Ile			
305						310				315								320
Ala	Phe	Ala	Pro	Val	Glu	Ser	Pro	Gly	Leu	Pro	Gly	Leu	Thr	Pro	Lys			
						325				330								335
Ser	Lys	Arg	Leu	Gly	His	Asp	Ser	Phe	Lys	Gly	Met	Gly	Val	Asp	Phe			
						340				345								350
Gly	Asp	Ile	Asp	Gly	Asp	Gly	Met	Phe	Asp	Leu	Tyr	Val	Gly	Asn	Ile			
						355				360								365
Thr	Thr	Ser	Phe	Gly	Ile	Gln	Glu	Ser	Asn	Phe	Ala	Phe	Val	Asn	Thr			
						370				375								380
Ala	Ala	Asp	Thr	Ala	Ala	Leu	Arg	Ala	Ala	Leu	Trp	Ala	Gly	Glu	Ala			
385						390				395								400
Pro	Trp	His	Asp	Arg	Ser	Ala	Glu	Leu	Gly	Leu	Ala	Trp	Ser	Gly	Trp			
						405				410								415
Ser	Trp	Asp	Val	Lys	Phe	Gly	Asp	Phe	Thr	Asn	Arg	Gly	Asp	Pro	Ala			
						420				425								430
Ile	Val	Gln	Thr	Ser	Gly	Phe	Val	Lys	Gly	Glu	Val	Asn	Arg	Trp	Ala			
						435				440								445
Gln	Leu	Gln	Glu	Ala	Ala	Thr	Ala	Asn	Asp	Asp	Leu	Leu	Ala	Asn	Pro			
						450				455								460
Arg	Trp	Trp	Pro	Lys	Val	Glu	Gln	Gly	Asp	Asp	Ile	Ala	Gly	Gly	Gln			
465						470				475								480
His	Leu	Ala	Phe	His	Val	Arg	Gly	Ala	Asp	Gly	Arg	Tyr	Glu	Asp	Leu			
						485				490								495
Ser	His	Glu	Leu	Gly	Leu	Ala	Asp	Arg	Val	Pro	Ser	Arg	Gly	Ile	Ala			
						500				505								510
Thr	Ala	Asp	Ala	Asp	Gly	Asp	Gly	Arg	Leu	Asp	Leu	Val	Val	Ala	Arg			
						515				520								525
Gln	Trp	Asp	Ala	Pro	Val	Phe	Tyr	Arg	Asn	Asp	Ser	Pro	Asp	Thr	Gly			
						530				535								540
Ser	Phe	Leu	Thr	Leu	Arg	Leu	Leu	His	Glu	Gln	Ala	Pro	Ala	Ala	Gly			
545						550				555								560
Pro	Leu	Ala	Gly	Ala	Gly	Ser	Pro	Val	Val	Gly	Ala	Gln	Val	Arg	Val			
						565				570								575
Thr	Thr	Pro	Asp	Gly	Arg	Val	Leu	Ile	Asp	Arg	Val	Asp	Gly	Gly	Ser			
						580				585								590
Gly	His	Ser	Gly	Arg	Arg	Ser	Asn	Glu	Val	Ser	Leu	Gly	Leu	Asp	Asp			
						595				600								605
Val	Thr	Gly	Pro	Val	Ser	Val	His	Leu	Thr	Trp	Arg	Asp	Arg	Ser	Gly			
						610				615								620
Ala	Pro	His	Glu	Gln	Glu	Leu	Thr	Leu	Ala	Pro	Gly	Arg	His	Thr	Leu			
625						630				635								640
Thr	Leu	Gly	Ser	Gln	Ala	Arg	Glu	Val	Ser	Arg								
						645				650								

<210> 59

<211> 630
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(630)

<400> 59

atg ggc gaa acg gga cgt cag ttg gcc gtc gtc acg gcg gac gcc gac	48
Met Gly Glu Thr Gly Arg Gln Leu Ala Val Val Thr Ala Asp Ala Asp	
1 5 10 15	
gtc gtg gag gcg gag ctg gtg gac gac gag acg gcc gcc gcc tcc gtc	96
Val Val Glu Ala Glu Leu Val Asp Asp Glu Thr Ala Gly Ala Ser Val	
20 25 30	
gtc gtc cac acg gac cgc gac cgg cac ctc tcc ccc gag acc gtc gcc	144
Val Val His Thr Asp Arg Asp Arg His Leu Ser Pro Glu Thr Val Ala	
35 40 45	
gcc atc gcg gcg agc gtc gcc gac tcc acc cgc cgc gcg tac gcc acc	192
Ala Ile Ala Ala Ser Val Ala Asp Ser Thr Arg Arg Ala Tyr Gly Thr	
50 55 60	
gac cgg gcc gcg ttc gcc gcc tgg tgc gcc gag gag gac cgc acg gcc	240
Asp Arg Ala Ala Phe Ala Ala Trp Cys Ala Glu Glu Asp Arg Thr Ala	
65 70 75 80	
gtc ccc gcg tcg gcg gag acg atg gcg gag tgg gtg cgg cac ctg acc	288
Val Pro Ala Ser Ala Glu Thr Met Ala Glu Trp Val Arg His Leu Thr	
85 90 95	
gtc acg ccc cgc ccc cgg acg cag cga ccg gcc ggg ccg tcg acc atc	336
Val Thr Pro Arg Pro Arg Thr Gln Arg Pro Ala Gly Pro Ser Thr Ile	
100 105 110	
gag cgg gcc atg tcc gcc gtg acc acc tgg cac gag gag cag gga cgg	384
Glu Arg Ala Met Ser Ala Val Thr Thr Trp His Glu Glu Gln Gly Arg	
115 120 125	
ccg aag ccg aac atg cgc gcc gcc cgg gcc gtc ctc aac gcc tac aag	432
Pro Lys Pro Asn Met Arg Gly Ala Arg Ala Val Leu Asn Ala Tyr Lys	
130 135 140	
gac cgg ctc gcc gtg gag aag gcg gag gcc gcg cag gcc cgc cag gcg	480
Asp Arg Leu Ala Val Glu Lys Ala Glu Ala Ala Gln Ala Arg Gln Ala	
145 150 155 160	
acc gcc gcc ctc ccc ccg cag atc cgc gcc atg ctc gcc ggg gtc gac	528
Thr Ala Ala Leu Pro Pro Gln Ile Arg Ala Met Leu Ala Gly Val Asp	
165 170 175	
cgg acc acc ctc gcc ggg aag cgg aac gcg gcc tgg tcc tcc tcg gtt	576
Arg Thr Thr Leu Ala Gly Lys Arg Asn Ala Ala Trp Ser Ser Ser Val	
180 185 190	
cgc cac gcc gcc cgc gtc ctc cga gct ggt cgc agc tgg acg tcg aca	624

Arg His Gly Gly Arg Val Leu Arg Ala Gly Arg Ser Trp Thr Ser Thr
 195 200 205

cgg tga
 Arg *

630

<210> 60
 <211> 209
 <212> PRT
 <213> Bacteria

<400> 60
 Met Gly Glu Thr Gly Arg Gln Leu Ala Val Val Thr Ala Asp Ala Asp
 1 5 10 15
 Val Val Glu Ala Glu Leu Val Asp Asp Glu Thr Ala Gly Ala Ser Val
 20 25 30
 Val Val His Thr Asp Arg Asp Arg His Leu Ser Pro Glu Thr Val Ala
 35 40 45
 Ala Ile Ala Ala Ser Val Ala Asp Ser Thr Arg Arg Ala Tyr Gly Thr
 50 55 60
 Asp Arg Ala Ala Phe Ala Ala Trp Cys Ala Glu Glu Asp Arg Thr Ala
 65 70 75 80
 Val Pro Ala Ser Ala Glu Thr Met Ala Glu Trp Val Arg His Leu Thr
 85 90 95
 Val Thr Pro Arg Pro Arg Thr Gln Arg Pro Ala Gly Pro Ser Thr Ile
 100 105 110
 Glu Arg Ala Met Ser Ala Val Thr Thr Trp His Glu Glu Gln Gly Arg
 115 120 125
 Pro Lys Pro Asn Met Arg Gly Ala Arg Ala Val Leu Asn Ala Tyr Lys
 130 135 140
 Asp Arg Leu Ala Val Glu Lys Ala Glu Ala Ala Gln Ala Arg Gln Ala
 145 150 155 160
 Thr Ala Ala Leu Pro Pro Gln Ile Arg Ala Met Leu Ala Gly Val Asp
 165 170 175
 Arg Thr Thr Leu Ala Gly Lys Arg Asn Ala Ala Trp Ser Ser Ser Val
 180 185 190
 Arg His Gly Gly Arg Val Leu Arg Ala Gly Arg Ser Trp Thr Ser Thr
 195 200 205
 Arg

<210> 61
 <211> 1566
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1) ... (1566)

<400> 61
 gtg ttc ttc gag gac tgc acc ctc gcg gag gcc acc tat ccc acg ctg
 Val Phe Phe Glu Asp Cys Thr Leu Ala Glu Ala Thr Tyr Pro Thr Leu
 1 5 10 15

48

ttc gcc ggg gtg gac gtc gtg ccg tcc agc gtc gac ctc cag cgc gtg	96
Phe Ala Gly Val Asp Val Val Pro Ser Ser Val Asp Leu Gln Arg Val	
20 25 30	
gag tac gaa cgg ccc atc ggc gcg gag cag ggc ctc gcc gcc gcc ctg	144
Glu Tyr Glu Arg Pro Ile Gly Ala Glu Gln Gly Leu Ala Ala Ala Leu	
35 40 45	
gcg cag gag gcg gag gag gcc ggc ggc cgc tcc ccg tac gac gtg acc	192
Ala Gln Glu Ala Glu Glu Ala Gly Gly Arg Ser Pro Tyr Asp Val Thr	
50 55 60	
ctg atc gac gcc gcg ccg tcc ctc ggg ctg gtc acc gtt gcc gca ctc	240
Leu Ile Asp Ala Ala Pro Ser Leu Gly Leu Val Thr Val Ala Ala Leu	
65 70 75 80	
acc gcc gcc gac gag gcc ctg gtg ccc atc aag gtc ggc ggc ctg gac	288
Thr Ala Ala Asp Glu Ala Leu Val Pro Ile Lys Val Gly Gly Leu Asp	
85 90 95	
atg aag gcc atg gcg tcc ctc cac aag acg ctc cgc agc gtc cag cgg	336
Met Lys Ala Met Ala Ser Leu His Lys Thr Leu Arg Ser Val Gln Arg	
100 105 110	
aag acg aac ccg aag ctg agc gtc ggg gcc gtc ctg ctg acc gcg tgg	384
Lys Thr Asn Pro Lys Leu Ser Val Gly Ala Val Leu Leu Thr Ala Trp	
115 120 125	
gac aag agc acg ttt gcc ccg cag ctc gcc acg aag gtg agc gag gac	432
Asp Lys Ser Thr Phe Ala Arg Gln Leu Ala Thr Lys Val Ser Glu Asp	
130 135 140	
tac ccg gag gcg gcc gtc gtg ccg atc ccg cgc agc atc cgc gcg tcg	480
Tyr Pro Glu Ala Ala Val Val Pro Ile Arg Arg Ser Ile Arg Ala Ser	
145 150 155 160	
gag gcc ccg ctc tcc gag gag ccg atc cgc ctg tac gcg ccc gag gcg	528
Glu Ala Pro Leu Ser Glu Glu Pro Ile Arg Leu Tyr Ala Pro Glu Ala	
165 170 175	
gcc ccg gcc ggg gac tac gac cag tgc ggc cgc cgt cct cct gcc ggg	576
Ala Pro Ala Gly Asp Tyr Asp Gln Cys Gly Arg Arg Pro Pro Ala Gly	
180 185 190	
gag ggc tgc cgc gtg agc cgc cgc tcc ctc gcc ctc ccg tcg acc agg	624
Glu Gly Cys Arg Val Ser Arg Arg Ser Leu Ala Leu Pro Ser Thr Arg	
195 200 205	
agc acc gag ccg gac cac gcc gac gag ctg gag gcc gcc ccc gaa gag	672
Ser Thr Glu Pro Asp His Ala Asp Glu Leu Glu Ala Ala Pro Glu Glu	
210 215 220	
aag ctc gcg gcc gcg ccg tcc gcc ggg gtg gtc gcc tcg ctg acc ggc	720
Lys Leu Ala Ala Ala Arg Ser Ala Gly Val Val Ala Ser Leu Thr Gly	
225 230 235 240	
gcg gac ctg tcg acg ccc ctc acc gtg gcg cag ctc ccc acg ccg tac	768
Ala Asp Leu Ser Thr Pro Leu Thr Val Ala Gln Leu Pro Thr Pro Tyr	

245	250	255	
gac gtc gcg gag acc gtc acg gcg ccg ctg aac gac cag gag cgc ggt			816
Asp Val Ala Glu Thr Val Thr Ala Pro Leu Asn Asp Gln Glu Arg Gly			
260	265	270	
tac ctg gac gtg tgc gag cag gcc ctc cac ggc ttc cgg aag tcc gtc			864
Tyr Leu Asp Val Cys Glu Gln Ala Leu His Gly Phe Arg Lys Ser Val			
275	280	285	
gtc gtc gcg ggc aag gcc ctg gag gtc atc aac cgc ggc cgc ctc tac			912
Val Val Ala Gly Lys Ala Leu Glu Val Ile Asn Arg Gly Arg Leu Tyr			
290	295	300	
cgg gag acg cac gag acg ttc gcg gac tac gtg acg gag gtg tgg gac			960
Arg Glu Thr His Glu Thr Phe Ala Asp Tyr Val Thr Glu Val Trp Asp			
305	310	315	320
atg aag cgg gcc cac gcc tat cgg atg atc gag ggg tgg cga ccg gcc			1008
Met Lys Arg Ala His Ala Tyr Arg Met Ile Glu Gly Trp Arg Pro Ala			
325	330	335	
gac ctc gtg tct cca att gga gac atc aac gag ggc cag gcc cgc gag			1056
Asp Leu Val Ser Pro Ile Gly Asp Ile Asn Glu Gly Gln Ala Arg Glu			
340	345	350	
ctg gcg ccc gtg ctc aag gag tac ggg ccc gag gtg acc gtc acc ctg			1104
Leu Ala Pro Val Leu Lys Glu Tyr Gly Pro Glu Val Thr Val Thr Leu			
355	360	365	
tac cgg ggg gtc aag gag ctg cgc ggc gac cgg cgg gtg acg gct gcg			1152
Tyr Arg Gly Val Lys Glu Leu Arg Gly Asp Arg Arg Val Thr Ala Ala			
370	375	380	
gac ctc tcg gag gcc cgg gca gcg ctg cct ccg ccg aag cac ctc gcc			1200
Asp Leu Ser Glu Ala Arg Ala Ala Leu Pro Pro Pro Lys His Leu Ala			
385	390	395	400
cgg ccg gac cag gtg cgc gac gtc ctc acc gtg gcg gcc gcc gag ggc			1248
Arg Pro Asp Gln Val Arg Asp Val Leu Thr Val Ala Ala Ala Glu Gly			
405	410	415	
cgc gcg ccc cgg ctc gcc ccg gcc gag ccg aag gtg ccg gcc cag gcc			1296
Arg Ala Pro Arg Leu Ala Pro Ala Glu Pro Lys Val Pro Ala Gln Ala			
420	425	430	
gcc gac gag cac cag gcc gag cag gtc gac gag ggc ggc gta agt cag			1344
Ala Asp Glu His Gln Ala Glu Gln Val Asp Glu Gly Gly Val Ser Gln			
435	440	445	
gac cag gtc gac gag ggc gcg gag gcc atc gcc acc ctg gag gcc gcc			1392
Asp Gln Val Asp Glu Gly Ala Glu Ala Ile Ala Thr Leu Glu Ala Ala			
450	455	460	
gtg gcc cag caa cgg cag atc tat gac cgg gtg ggc ggc ggg act ctc			1440
Val Ala Gln Gln Arg Gln Ile Tyr Asp Arg Val Gly Gly Gly Thr Leu			
465	470	475	480

gcg gcc gcc ctg ctg tac gac cca ggc cgg ggt gac cat ctg cgc cgc	1488
Ala Ala Ala Leu Leu Tyr Asp Pro Gly Arg Gly Asp His Leu Arg Arg	
485 490 495	
gag ctg cgg cag tac gcg cag cgg acg gcg tac cgg gca cgg gat acc	1536
Glu Leu Arg Gln Tyr Ala Gln Arg Thr Ala Tyr Arg Ala Arg Asp Thr	
500 505 510	
tcc ggt gag cag gtg gcc gac gac gcg taa	1566
Ser Gly Glu Gln Val Ala Asp Asp Ala *	
515 520	

<210> 62
 <211> 521
 <212> PRT
 <213> Bacteria

<400> 62

Val Phe Phe Glu Asp Cys Thr Leu Ala Glu Ala Thr Tyr Pro Thr Leu	
1 5 10 15	
Phe Ala Gly Val Asp Val Val Pro Ser Ser Val Asp Leu Gln Arg Val	
20 25 30	
Glu Tyr Glu Arg Pro Ile Gly Ala Glu Gln Gly Leu Ala Ala Leu	
35 40 45	
Ala Gln Glu Ala Glu Glu Ala Gly Gly Arg Ser Pro Tyr Asp Val Thr	
50 55 60	
Leu Ile Asp Ala Ala Pro Ser Leu Gly Leu Val Thr Val Ala Ala Leu	
65 70 75 80	
Thr Ala Ala Asp Glu Ala Leu Val Pro Ile Lys Val Gly Gly Leu Asp	
85 90 95	
Met Lys Ala Met Ala Ser Leu His Lys Thr Leu Arg Ser Val Gln Arg	
100 105 110	
Lys Thr Asn Pro Lys Leu Ser Val Gly Ala Val Leu Leu Thr Ala Trp	
115 120 125	
Asp Lys Ser Thr Phe Ala Arg Gln Leu Ala Thr Lys Val Ser Glu Asp	
130 135 140	
Tyr Pro Glu Ala Ala Val Val Pro Ile Arg Arg Ser Ile Arg Ala Ser	
145 150 155 160	
Glu Ala Pro Leu Ser Glu Glu Pro Ile Arg Leu Tyr Ala Pro Glu Ala	
165 170 175	
Ala Pro Ala Gly Asp Tyr Asp Gln Cys Gly Arg Arg Pro Pro Ala Gly	
180 185 190	
Glu Gly Cys Arg Val Ser Arg Arg Ser Leu Ala Leu Pro Ser Thr Arg	
195 200 205	
Ser Thr Glu Pro Asp His Ala Asp Glu Leu Glu Ala Ala Pro Glu Glu	
210 215 220	
Lys Leu Ala Ala Ala Arg Ser Ala Gly Val Val Ala Ser Leu Thr Gly	
225 230 235 240	
Ala Asp Leu Ser Thr Pro Leu Thr Val Ala Gln Leu Pro Thr Pro Tyr	
245 250 255	
Asp Val Ala Glu Thr Val Thr Ala Pro Leu Asn Asp Gln Glu Arg Gly	
260 265 270	
Tyr Leu Asp Val Cys Glu Gln Ala Leu His Gly Phe Arg Lys Ser Val	
275 280 285	
Val Val Ala Gly Lys Ala Leu Glu Val Ile Asn Arg Gly Arg Leu Tyr	
290 295 300	
Arg Glu Thr His Glu Thr Phe Ala Asp Tyr Val Thr Glu Val Trp Asp	

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305          310          315          320
Met Lys Arg Ala His Ala Tyr Arg Met Ile Glu Gly Trp Arg Pro Ala
          325          330          335
Asp Leu Val Ser Pro Ile Gly Asp Ile Asn Glu Gly Gln Ala Arg Glu
          340          345          350
Leu Ala Pro Val Leu Lys Glu Tyr Gly Pro Glu Val Thr Val Thr Leu
          355          360          365
Tyr Arg Gly Val Lys Glu Leu Arg Gly Asp Arg Arg Val Thr Ala Ala
          370          375          380
Asp Leu Ser Glu Ala Arg Ala Ala Leu Pro Pro Pro Lys His Leu Ala
385          390          395          400
Arg Pro Asp Gln Val Arg Asp Val Leu Thr Val Ala Ala Ala Glu Gly
          405          410          415
Arg Ala Pro Arg Leu Ala Pro Ala Glu Pro Lys Val Pro Ala Gln Ala
          420          425          430
Ala Asp Glu His Gln Ala Glu Gln Val Asp Glu Gly Gly Val Ser Gln
          435          440          445
Asp Gln Val Asp Glu Gly Ala Glu Ala Ile Ala Thr Leu Glu Ala Ala
          450          455          460
Val Ala Gln Gln Arg Gln Ile Tyr Asp Arg Val Gly Gly Gly Thr Leu
465          470          475          480
Ala Ala Ala Leu Leu Tyr Asp Pro Gly Arg Gly Asp His Leu Arg Arg
          485          490          495
Glu Leu Arg Gln Tyr Ala Gln Arg Thr Ala Tyr Arg Ala Arg Asp Thr
          500          505          510
Ser Gly Glu Gln Val Ala Asp Asp Ala
          515          520

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<210> 63
<211> 528
<212> DNA
<213> Bacteria

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<220>
<221> CDS
<222> (1)...(528)

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<400> 63
atg gga gag gcg cga gtg ccg acg agg aag cgc ggg ccg aac atg gcc      48
Met Gly Glu Ala Arg Val Pro Thr Arg Lys Arg Gly Pro Asn Met Ala
   1             5             10             15

ctg gtc aac atg gac acc gga gag gcg gtg tcc gcc agg ccg cgg act      96
Leu Val Asn Met Asp Thr Gly Glu Ala Val Ser Ala Arg Pro Arg Thr
          20             25             30

ccg cac cag ttc gac ggg aag ggg tac acc ttg cag gcc gta ggc agc      144
Pro His Gln Phe Asp Gly Lys Gly Tyr Thr Leu Gln Ala Val Gly Ser
          35             40             45

gac gtc ccc ctg tac tcc ctc ggg ctg gcc gca gcg gag tgg gcg acg      192
Asp Val Pro Leu Tyr Ser Leu Gly Leu Ala Ala Glu Trp Ala Thr
          50             55             60

ctc gaa tgg ctc cgc gaa cac gga ggc gcg gcc gga tac gtc ccg gtc      240
Leu Glu Trp Leu Arg Glu His Gly Gly Ala Ala Gly Tyr Val Pro Val
          65             70             75             80

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acg ccc gag gag ctg ggc gag gac gtc ggc gcc agc aag gac acc tgc 288
 Thr Pro Glu Glu Leu Gly Glu Asp Val Gly Ala Ser Lys Asp Thr Cys
 85 90 95

cgg aag gcc ctt aac cgg ctg gtc aag ctc ggg ctt gtg gtc aag ccg 336
 Arg Lys Ala Leu Asn Arg Leu Val Lys Leu Gly Leu Val Val Lys Pro
 100 105 110

ggc ccg cga tcc ggc tct tac cag ctg aac ccc ctc cga tac tgg gag 384
 Gly Pro Arg Ser Gly Ser Tyr Gln Leu Asn Pro Leu Arg Tyr Trp Glu
 115 120 125

gga gcc ggg agc acg cag gtc aac gcc tgc cgc cgc atg gcg ccg ccg 432
 Gly Ala Gly Ser Thr Gln Val Asn Ala Cys Arg Arg Met Ala Pro Pro
 130 135 140

cgt gtg gcc ccg gac gac aag gcc atg acc agg tcc gcc agc aag ccc 480
 Arg Val Ala Pro Asp Asp Lys Ala Met Thr Arg Ser Ala Ser Lys Pro
 145 150 155 160

aag acc atc ccg gct acc cgc cgc cgc gcc gca gga gag acg cga tga 528
 Lys Thr Ile Pro Ala Thr Arg Arg Arg Ala Ala Gly Glu Thr Arg *
 165 170 175

<210> 64
 <211> 175
 <212> PRT
 <213> Bacteria

<400> 64
 Met Gly Glu Ala Arg Val Pro Thr Arg Lys Arg Gly Pro Asn Met Ala
 1 5 10 15
 Leu Val Asn Met Asp Thr Gly Glu Ala Val Ser Ala Arg Pro Arg Thr
 20 25 30
 Pro His Gln Phe Asp Gly Lys Gly Tyr Thr Leu Gln Ala Val Gly Ser
 35 40 45
 Asp Val Pro Leu Tyr Ser Leu Gly Leu Ala Ala Ala Glu Trp Ala Thr
 50 55 60
 Leu Glu Trp Leu Arg Glu His Gly Gly Ala Ala Gly Tyr Val Pro Val
 65 70 75 80
 Thr Pro Glu Glu Leu Gly Glu Asp Val Gly Ala Ser Lys Asp Thr Cys
 85 90 95
 Arg Lys Ala Leu Asn Arg Leu Val Lys Leu Gly Leu Val Val Lys Pro
 100 105 110
 Gly Pro Arg Ser Gly Ser Tyr Gln Leu Asn Pro Leu Arg Tyr Trp Glu
 115 120 125
 Gly Ala Gly Ser Thr Gln Val Asn Ala Cys Arg Arg Met Ala Pro Pro
 130 135 140
 Arg Val Ala Pro Asp Asp Lys Ala Met Thr Arg Ser Ala Ser Lys Pro
 145 150 155 160
 Lys Thr Ile Pro Ala Thr Arg Arg Arg Ala Ala Gly Glu Thr Arg
 165 170 175

<210> 65

<211> 420
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(420)

<400> 65
 atg acg acc atg ccc gta gaa ggc ttc aac ccg gag cgc gac ctg acc 48
 Met Thr Thr Met Pro Val Glu Gly Phe Asn Pro Glu Arg Asp Leu Thr
 1 5 10 15
 gcc ccg tcg ctg tac tcg ctg aac ctg tcc gcc gct cag cac tgc acg 96
 Ala Pro Ser Leu Tyr Ser Leu Asn Leu Ser Ala Ala Gln His Cys Thr
 20 25 30
 ctc gcg tgg gtg gag gac cac ggc ggc ctg ttt gac gtc atc ccc gta 144
 Leu Ala Trp Val Glu Asp His Gly Gly Leu Phe Asp Val Ile Pro Val
 35 40 45
 ccg gtc gaa acc gtc gcc gag gac tgc ggc aac tcc gtc tcc acg gtg 192
 Pro Val Glu Thr Val Ala Glu Asp Cys Gly Asn Ser Val Ser Thr Val
 50 55 60
 cac gag gct ctc gcc cgc ctg gag gcc ctg aac ctc ctc gtg cgg acc 240
 His Glu Ala Leu Ala Arg Leu Glu Ala Leu Asn Leu Leu Val Arg Thr
 65 70 75 80
 tcc gcc ggc ctc tac cgg atc aac gcc cgg tac tac ttc acg ctg cac 288
 Ser Ala Gly Leu Tyr Arg Ile Asn Ala Arg Tyr Tyr Phe Thr Leu His
 85 90 95
 ccc gag ctg cgc gag atg atc acc gcc gcc ctc acg gac ccc ccg gtc 336
 Pro Glu Leu Arg Glu Met Ile Thr Ala Ala Leu Thr Asp Pro Pro Val
 100 105 110
 acc ccg gac gac cgt gcc cgc gcg ccc cgc aag gtc agc aac acc gac 384
 Thr Pro Asp Asp Arg Ala Arg Ala Pro Arg Lys Val Ser Asn Thr Asp
 115 120 125
 gct cgc cgc cgc cgg acg atc cgc ccc gtc tct tga 420
 Ala Arg Arg Arg Arg Thr Ile Arg Pro Val Ser *
 130 135

<210> 66
 <211> 139
 <212> PRT
 <213> Bacteria

<400> 66
 Met Thr Thr Met Pro Val Glu Gly Phe Asn Pro Glu Arg Asp Leu Thr
 1 5 10 15
 Ala Pro Ser Leu Tyr Ser Leu Asn Leu Ser Ala Ala Gln His Cys Thr
 20 25 30
 Leu Ala Trp Val Glu Asp His Gly Gly Leu Phe Asp Val Ile Pro Val
 35 40 45

Pro Val Glu Thr Val Ala Glu Asp Cys Gly Asn Ser Val Ser Thr Val
50 55 60
His Glu Ala Leu Ala Arg Leu Glu Ala Leu Asn Leu Leu Val Arg Thr
65 70 75 80
Ser Ala Gly Leu Tyr Arg Ile Asn Ala Arg Tyr Tyr Phe Thr Leu His
85 90 95
Pro Glu Leu Arg Glu Met Ile Thr Ala Ala Leu Thr Asp Pro Pro Val
100 105 110
Thr Pro Asp Arg Arg Ala Arg Ala Pro Arg Lys Val Ser Asn Thr Asp
115 120 125
Ala Arg Arg Arg Arg Thr Ile Arg Pro Val Ser
130 135

<210> 67
<211> 564
<212> DNA
<213> Bacteria

<220>
<221> CDS
<222> (1) ... (564)

<400> 67
gtg cca gac ggt cag ttg ccg ccc tgt acg gga gga agc tcg aag cct 48
Val Pro Asp Gly Gln Leu Pro Pro Cys Thr Gly Gly Ser Ser Lys Pro
1 5 10 15
tca ggc tgc tcg tgt cca tcg cca acg agc gtc tgc gtc acg gcc agg 96
Ser Gly Cys Ser Cys Pro Ser Pro Thr Ser Val Cys Val Thr Ala Arg
20 25 30
acg tcg ccc ttc gcg tcg tac tgg acg gtc cgg tac agc atc aca ggc 144
Thr Ser Pro Phe Ala Ser Tyr Trp Thr Val Arg Tyr Ser Ile Thr Gly
35 40 45
ttg ctc gcg gag ggc gga agg ccg aag tct tcg cac tcg aac cag gcg 192
Leu Leu Ala Glu Gly Gly Arg Pro Lys Ser Ser His Ser Asn Gln Ala
50 55 60
agc atc cga gcg gtc agg gtg cgc tcc agc cgg acg cac ccc gga atc 240
Ser Ile Arg Ala Val Arg Val Arg Ser Ser Arg Thr His Pro Gly Ile
65 70 75 80
gtg ggg gcc aca ggc gtt aga gcc agg tcc ggc gag acg cgc ggc ggc 288
Val Gly Ala Thr Gly Val Arg Ala Arg Ser Gly Glu Thr Arg Gly Gly
85 90 95
ggg atc ggg agc cca aga cct ggc gca agc ctc cgc acc gtc tca ctc 336
Gly Ile Gly Ser Pro Arg Pro Gly Ala Ser Leu Arg Thr Val Ser Leu
100 105 110
acg acg gcc acc ggg tca cca agg ctg gtc agg tcg aac cac tcg ccc 384
Thr Thr Ala Thr Gly Ser Pro Arg Leu Val Arg Ser Asn His Ser Pro
115 120 125
cgc cgg ttg tgc tca cgg aac tcc tgg tgg agc gcc ccc tca agg gcg 432
Arg Arg Leu Cys Ser Arg Asn Ser Trp Trp Ser Ala Pro Ser Arg Ala

130	135	140	
cgg ccg ccc tcg cac gtc cac agc acc gac agc gtc agc ggc aga ccg			480
Arg Pro Pro Ser His Val His Ser Thr Asp Ser Val Ser Gly Arg Pro			
145	150	155	160
gtc tgc atc gtg cgg act ctc ctc tcc acg tct gtc gtg gtg ccg atc			528
Val Cys Ile Val Arg Thr Leu Leu Ser Thr Ser Val Val Val Pro Ile			
	165	170	175
ttc acc agg tct agg ccc tcg gct cct aag aga tag			564
Phe Thr Arg Ser Arg Pro Ser Ala Pro Lys Arg *			
	180	185	

<210> 68
 <211> 187
 <212> PRT
 <213> Bacteria

<400> 68
 Val Pro Asp Gly Gln Leu Pro Pro Cys Thr Gly Gly Ser Ser Lys Pro
 1 5 10 15
 Ser Gly Cys Ser Cys Pro Ser Pro Thr Ser Val Cys Val Thr Ala Arg
 20 25 30
 Thr Ser Pro Phe Ala Ser Tyr Trp Thr Val Arg Tyr Ser Ile Thr Gly
 35 40 45
 Leu Leu Ala Glu Gly Gly Arg Pro Lys Ser Ser His Ser Asn Gln Ala
 50 55 60
 Ser Ile Arg Ala Val Arg Val Arg Ser Ser Arg Thr His Pro Gly Ile
 65 70 75 80
 Val Gly Ala Thr Gly Val Arg Ala Arg Ser Gly Glu Thr Arg Gly Gly
 85 90 95
 Gly Ile Gly Ser Pro Arg Pro Gly Ala Ser Leu Arg Thr Val Ser Leu
 100 105 110
 Thr Thr Ala Thr Gly Ser Pro Arg Leu Val Arg Ser Asn His Ser Pro
 115 120 125
 Arg Arg Leu Cys Ser Arg Asn Ser Trp Trp Ser Ala Pro Ser Arg Ala
 130 135 140
 Arg Pro Pro Ser His Val His Ser Thr Asp Ser Val Ser Gly Arg Pro
 145 150 155 160
 Val Cys Ile Val Arg Thr Leu Leu Ser Thr Ser Val Val Val Pro Ile
 165 170 175
 Phe Thr Arg Ser Arg Pro Ser Ala Pro Lys Arg
 180 185

<210> 69
 <211> 798
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1) ... (798)

<400> 69
 atg gcg act agg cgg aag ggc cgc cct ggc ggc tat gag gaa atc gcc 48

1. *Staphylococcus aureus* (1000)
 2. *Staphylococcus aureus* (1000)
 3. *Staphylococcus aureus* (1000)
 4. *Staphylococcus aureus* (1000)
 5. *Staphylococcus aureus* (1000)
 6. *Staphylococcus aureus* (1000)
 7. *Staphylococcus aureus* (1000)
 8. *Staphylococcus aureus* (1000)
 9. *Staphylococcus aureus* (1000)
 10. *Staphylococcus aureus* (1000)

ggc gcg gct gac agg ctg acg ctg acc tac aag ggc ctg cca ctc cgg 768
 Gly Ala Ala Asp Arg Leu Thr Leu Thr Tyr Lys Gly Leu Pro Leu Arg
 245 250 255

gcg acc gga gcc gag ggg agc acg tca tga 798
 Ala Thr Gly Ala Glu Gly Ser Thr Ser *
 260 265

<210> 70
 <211> 265
 <212> PRT
 <213> Bacteria

<400> 70
 Met Ala Thr Arg Arg Lys Gly Arg Pro Gly Gly Tyr Glu Glu Ile Ala
 1 5 10 15
 Ala His Phe Arg Arg Leu Met Asp Ser Gly Glu Leu Ser Pro Gly Asp
 20 25 30
 Pro Leu Pro Ser Met Arg Asp Val Cys Asp Gln Phe Gly Ser Ala Ile
 35 40 45
 Thr Thr Val Asn Arg Ala Phe Arg Leu Leu Gln Glu Glu Gly Arg Thr
 50 55 60
 Val Ser Lys Pro Gly Val Gly Thr Ile Val Arg Asp Met Ser Arg Val
 65 70 75 80
 Arg Val Pro Phe Ser Thr Tyr Gly Asp Val Leu Ala Pro Gly Gly Asp
 85 90 95
 Lys Gly Pro Trp Glu Arg Ala Thr Ala Ala Gln Gly Leu Asp Gly Arg
 100 105 110
 Met Leu Val Glu Ala Pro Glu Glu Val Gly Ala Pro Ala Asp Val Ala
 115 120 125
 Ala Arg Leu Gly Ile Glu Pro Gly Ala Leu Val Val His Arg Arg Arg
 130 135 140
 Arg Ala Thr Ile Gly Glu Asp Val Val Gln Leu Gln Asp Ala Trp Tyr
 145 150 155 160
 Pro Leu Glu Ile Ala Arg Ala Ala Gly Leu Asp Arg Pro Gly Lys Val
 165 170 175
 Val Gly Gly Val Leu Gly Ala Met Thr Gly Ala Gly Leu Ser Pro Thr
 180 185 190
 Ser Thr Asp His Asp Val Glu Val Trp Val Pro Ser Ala Gln Gln Ala
 195 200 205
 Ala Glu Leu Ser Leu Gly Ser Arg Val Ser Val Leu Val Val Glu Arg
 210 215 220
 Val Thr Tyr Asp Ala Thr Val Arg Val Leu Glu Leu Thr Arg His Thr
 225 230 235 240
 Gly Ala Ala Asp Arg Leu Thr Leu Thr Tyr Lys Gly Leu Pro Leu Arg
 245 250 255
 Ala Thr Gly Ala Glu Gly Ser Thr Ser
 260 265

<210> 71
 <211> 378
 <212> DNA
 <213> Bacteria

<220>

<221> CDS

<222> (1)...(378)

<400> 71

atg tcc acg acc acc aac gcg gtc acc tgg ttc gag gtc ggc acc gac	48
Met Ser Thr Thr Thr Asn Ala Val Thr Trp Phe Glu Val Gly Thr Asp	
1 5 10 15	
cgg ccg gag gag acc ggg cgc ttc tac gcc gac ctg ttc ggt tgg gcg	96
Arg Pro Glu Glu Thr Gly Arg Phe Tyr Ala Asp Leu Phe Gly Trp Ala	
20 25 30	
ttc ggc gag cag ggg acg ccg gag gcg tcg tac cgg gtg acg gag ccg	144
Phe Gly Glu Gln Gly Thr Pro Glu Ala Ser Tyr Arg Val Thr Glu Pro	
35 40 45	
ggg ccg gag ggc tcg atc cag ggc gcg atc cgg ggc acc ggc ggg gcg	192
Gly Pro Glu Gly Ser Ile Gln Gly Ala Ile Arg Gly Thr Gly Gly Ala	
50 55 60	
agc ccg aac tac gcc atc ttc tac gtg cag gtg gcc gac gtg gcg gac	240
Ser Pro Asn Tyr Ala Ile Phe Tyr Val Gln Val Ala Asp Val Ala Asp	
65 70 75 80	
gcc tgc cgg cgc gcg gag gcg gcc ggt ggc aag gtg ctg gtg ccg gcg	288
Ala Cys Arg Arg Ala Glu Ala Ala Gly Gly Lys Val Leu Val Pro Ala	
85 90 95	
aag tcc acc gac aac ggg ctg acc ttc gcc cac ctg ctg gac ccg gtc	336
Lys Ser Thr Asp Asn Gly Leu Thr Phe Ala His Leu Leu Asp Pro Val	
100 105 110	
ggc aac cac ttc ggc gtc ttc gcc ccg ccg ccg gcc gcc tga	378
Gly Asn His Phe Gly Val Phe Ala Pro Pro Pro Ala Ala *	
115 120 125	

<210> 72

<211> 125

<212> PRT

<213> Bacteria

<400> 72

Met Ser Thr Thr Thr Asn Ala Val Thr Trp Phe Glu Val Gly Thr Asp	
1 5 10 15	
Arg Pro Glu Glu Thr Gly Arg Phe Tyr Ala Asp Leu Phe Gly Trp Ala	
20 25 30	
Phe Gly Glu Gln Gly Thr Pro Glu Ala Ser Tyr Arg Val Thr Glu Pro	
35 40 45	
Gly Pro Glu Gly Ser Ile Gln Gly Ala Ile Arg Gly Thr Gly Gly Ala	
50 55 60	
Ser Pro Asn Tyr Ala Ile Phe Tyr Val Gln Val Ala Asp Val Ala Asp	
65 70 75 80	
Ala Cys Arg Arg Ala Glu Ala Ala Gly Gly Lys Val Leu Val Pro Ala	
85 90 95	
Lys Ser Thr Asp Asn Gly Leu Thr Phe Ala His Leu Leu Asp Pro Val	
100 105 110	

Gly Asn His Phe Gly Val Phe Ala Pro Pro Pro Ala Ala
 115 120 125

<210> 73
 <211> 741
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(741)

<400> 73
 gtg cgg cga cgg cct gaa tcg tgg ggc cgg aag ccg gag ccg ccg tcc 48
 Val Arg Arg Arg Pro Glu Ser Trp Gly Arg Lys Pro Glu Pro Pro Ser
 1 5 10 15
 gcc ccg gcg agg ttg ccg ggg cgg acg gcg tac ggt cac ttg ccg gcc 96
 Ala Pro Ala Arg Leu Pro Gly Arg Thr Ala Tyr Gly His Leu Pro Ala
 20 25 30
 gag cct ccg cga ccg ccc ggg ccg gcc agg acg ccg gcc tcg gcg gcc 144
 Glu Pro Pro Arg Pro Pro Gly Pro Ala Arg Thr Pro Ala Ser Ala Ala
 35 40 45
 gcg gtg atc gcg tcc gcc tgc tcc tgg gtg agc ttg ccg tcc tcg acc 192
 Ala Val Ile Ala Ser Ala Cys Ser Trp Val Ser Leu Pro Ser Ser Thr
 50 55 60
 gcc tgc gcc agg cgc tcc ttc agc gcg gcc tgc ccg tcg gcg gag tca 240
 Ala Cys Ala Arg Arg Ser Phe Ser Ala Ala Cys Arg Ser Ala Glu Ser
 65 70 75 80
 ccc cgc tcg ggc cgg tcg gcc ggc ttc tgc gcc tcg cgc acc ttc tcc 288
 Pro Arg Ser Gly Arg Ser Ala Gly Phe Cys Ala Ser Arg Thr Phe Ser
 85 90 95
 agc gcg gcc gtc acc ttg tcg gtg tcg acg ccc agc tcc ttg gcc agg 336
 Ser Ala Ala Val Thr Leu Ser Val Ser Thr Pro Ser Ser Leu Ala Arg
 100 105 110
 gcc tcg gcg aac tcc gcc tgc cgc tcg gcc cgc tgc tgc tgc cgc tcg 384
 Ala Ser Ala Asn Ser Ala Cys Arg Ser Ala Arg Cys Cys Cys Arg Ser
 115 120 125
 tca ctg ctg ctg ccg ctc tcg ctc gcg ctg gcg ctc ggc gtc gcg gtg 432
 Ser Leu Leu Leu Pro Leu Ser Leu Ala Leu Ala Leu Gly Val Ala Val
 130 135 140
 ccg ccg tcc gcg gcg aac gcg acc gtc ggc gcc gcg atc ccc acg ccg 480
 Pro Pro Ser Ala Ala Asn Ala Thr Val Gly Ala Ala Ile Pro Thr Pro
 145 150 155 160
 aga acc ccg gcc gcg gcc agg ccg gcc agc agg tgc ttc ttc ttc atg 528
 Arg Thr Pro Ala Ala Ala Arg Pro Ala Ser Arg Cys Phe Phe Phe Met
 165 170 175


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gtg ccg gac atg ctg tcc tcc gtc gga tcc gtg gtt ggt gcg atg acc 576
Val Pro Asp Met Leu Ser Ser Val Gly Ser Val Val Gly Ala Met Thr
180 185 190

tca ccc gac ggt gac cag ccc ggc tgg ggg aaa gcc gtg gtg aac ctg 624
Ser Pro Asp Gly Asp Gln Pro Gly Trp Gly Lys Ala Val Val Asn Leu
195 200 205

tca gcg agc tgg caa tcc gcc cgc cgc gcc gga caa acg ggt tgc cgg 672
Ser Ala Ser Trp Gln Ser Ala Arg Arg Ala Gly Gln Thr Gly Cys Arg
210 215 220

ggc gcc cgc cgc cgg tca ggg ttg gtg gtc ggc agg ccc cac cgg ggc 720
Gly Ala Arg Arg Arg Ser Gly Leu Val Val Gly Arg Pro His Arg Gly
225 230 235 240

gga gca gac gac gga agg tga 741
Gly Ala Asp Asp Gly Arg *
245

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<210> 74
<211> 246
<212> PRT
<213> Bacteria

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<400> 74
Val Arg Arg Arg Pro Glu Ser Trp Gly Arg Lys Pro Glu Pro Pro Ser
1 5 10 15
Ala Pro Ala Arg Leu Pro Gly Arg Thr Ala Tyr Gly His Leu Pro Ala
20 25 30
Glu Pro Pro Arg Pro Pro Gly Pro Ala Arg Thr Pro Ala Ser Ala Ala
35 40 45
Ala Val Ile Ala Ser Ala Cys Ser Trp Val Ser Leu Pro Ser Ser Thr
50 55 60
Ala Cys Ala Arg Arg Ser Phe Ser Ala Ala Cys Arg Ser Ala Glu Ser
65 70 75 80
Pro Arg Ser Gly Arg Ser Ala Gly Phe Cys Ala Ser Arg Thr Phe Ser
85 90 95
Ser Ala Ala Val Thr Leu Ser Val Ser Thr Pro Ser Ser Leu Ala Arg
100 105 110
Ala Ser Ala Asn Ser Ala Cys Arg Ser Ala Arg Cys Cys Cys Arg Ser
115 120 125
Ser Leu Leu Leu Pro Leu Ser Leu Ala Leu Ala Leu Gly Val Ala Val
130 135 140
Pro Pro Ser Ala Ala Asn Ala Thr Val Gly Ala Ala Ile Pro Thr Pro
145 150 155 160
Arg Thr Pro Ala Ala Ala Arg Pro Ala Ser Arg Cys Phe Phe Phe Met
165 170 175
Val Pro Asp Met Leu Ser Ser Val Gly Ser Val Val Gly Ala Met Thr
180 185 190
Ser Pro Asp Gly Asp Gln Pro Gly Trp Gly Lys Ala Val Val Asn Leu
195 200 205
Ser Ala Ser Trp Gln Ser Ala Arg Arg Ala Gly Gln Thr Gly Cys Arg
210 215 220
Gly Ala Arg Arg Arg Ser Gly Leu Val Val Gly Arg Pro His Arg Gly
225 230 235 240
Gly Ala Asp Asp Gly Arg

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<210> 75
 <211> 891
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(891)

<400> 75

gtg atc ctc gtg gcg ttg gcg aag atc cgg gaa gtc ccg ctc acc ggg	48
Val Ile Leu Val Ala Leu Ala Lys Ile Arg Glu Val Pro Leu Thr Gly	
1 5 10 15	
gcg gac gcc ggc ccg tac ggc gtc acc gtc ggc ccc gac ggc gcg ctc	96
Ala Asp Ala Gly Pro Tyr Gly Val Thr Val Gly Pro Asp Gly Ala Leu	
20 25 30	
tgg ctg acg ctg gtc cac gcc ggc gcg gtc gcc cgg gtg ggc gcg gac	144
Trp Leu Thr Leu Val His Ala Gly Ala Val Ala Arg Val Gly Ala Asp	
35 40 45	
ggc gac ctg cgc acc tgg cag gtg gcg gcc gac agc cgg ccg ctg atc	192
Gly Asp Leu Arg Thr Trp Gln Val Ala Ala Asp Ser Arg Pro Leu Ile	
50 55 60	
gtc acg ccg ggc ccc gac ggc gcc ctc tgg ttc acc cgc tcc ggc gac	240
Val Thr Pro Gly Pro Asp Gly Ala Leu Trp Phe Thr Arg Ser Gly Asp	
65 70 75 80	
gac cgg atc ggc cgg atc acc acc gac ggg gag cag agc gcc gtc gcg	288
Asp Arg Ile Gly Arg Ile Thr Thr Asp Gly Glu Gln Ser Ala Val Ala	
85 90 95	
ctc ccg ccc ggg agc ggc ccc tgc ggc atc gcc gcc ggt ccc gac ggc	336
Leu Pro Pro Gly Ser Gly Pro Cys Gly Ile Ala Ala Gly Pro Asp Gly	
100 105 110	
gcc ctc tgg tac gcg gcg atg acc gcc gac gcg gtc ggc cgc gtc acc	384
Ala Leu Trp Tyr Ala Ala Met Thr Ala Asp Ala Val Gly Arg Val Thr	
115 120 125	
acc gac ggg aag gtg acg cag ttt ccg ctg ccg gtg agc ggc ggc ttc	432
Thr Asp Gly Lys Val Thr Gln Phe Pro Leu Pro Val Ser Gly Gly Phe	
130 135 140	
gcc tcg atg gtc gcc gcc ggc ccg gac gag gcc gtc tgg ttc acg ctc	480
Ala Ser Met Val Ala Ala Gly Pro Asp Glu Ala Val Trp Phe Thr Leu	
145 150 155 160	
aac cag gcg aac gcg gtc ggc cgg atc ggc acg gac ggc gcg gtg gcg	528
Asn Gln Ala Asn Ala Val Gly Arg Ile Gly Thr Asp Gly Ala Val Ala	
165 170 175	
ctg cac cca ctg ccg acc gag ggc gcc gcc ccg gtg ggc atc acg gcc	576

Leu His Pro Leu Pro Thr Glu Gly Ala Ala Pro Val Gly Ile Thr Ala
 180 185 190
 gga gcg gac ggc gcg ctc tgg ttc gtc gag atc ggc gcc ggc cag ctc 624
 Gly Ala Asp Gly Ala Leu Trp Phe Val Glu Ile Gly Ala Gly Gln Leu
 195 200 205
 ggc cgg atc acc ccg gac ggg cgg atc gac gag tac ccg ctg ccg gac 672
 Gly Arg Ile Thr Pro Asp Gly Arg Ile Asp Glu Tyr Pro Leu Pro Asp
 210 215 220
 cgg gcg gcc cgg ccg cac gcg atc gtc gcc gac ccg gcg ggc ggc tgc 720
 Arg Ala Ala Arg Pro His Ala Ile Val Ala Asp Pro Ala Gly Gly Cys
 225 230 235 240
 tgg ttc acc gag tgg ggc ggc aac cgg atc ggc cac gtc gcc ccg gac 768
 Trp Phe Thr Glu Trp Gly Gly Asn Arg Ile Gly His Val Ala Pro Asp
 245 250 255
 ggc acg atc gtc acc cac gac ctt ccg acc ccg gcc gcc gag ccg cac 816
 Gly Thr Ile Val Thr His Asp Leu Pro Thr Pro Ala Ala Glu Pro His
 260 265 270
 ggc atc acc gtc gcc ccc gac ggc acg gtc tgg gcc gcc ctg gaa acg 864
 Gly Ile Thr Val Ala Pro Asp Gly Thr Val Trp Ala Ala Leu Glu Thr
 275 280 285
 ggc gct ctg gcc cac ctg acg ccc tga 891
 Gly Ala Leu Ala His Leu Thr Pro *
 290 295

<210> 76
 <211> 125
 <212> PRT
 <213> Bacteria

<400> 76
 Met Ser Thr Thr Thr Asn Ala Val Thr Trp Phe Glu Val Gly Thr Asp
 1 5 10 15
 Arg Pro Glu Glu Thr Gly Arg Phe Tyr Ala Asp Leu Phe Gly Trp Ala
 20 25 30
 Phe Gly Glu Gln Gly Thr Pro Glu Ala Ser Tyr Arg Val Thr Glu Pro
 35 40 45
 Gly Pro Glu Gly Ser Ile Gln Gly Ala Ile Arg Gly Thr Gly Gly Ala
 50 55 60
 Ser Pro Asn Tyr Ala Ile Phe Tyr Val Gln Val Ala Asp Val Ala Asp
 65 70 75 80
 Ala Cys Arg Arg Ala Glu Ala Ala Gly Gly Lys Val Leu Val Pro Ala
 85 90 95
 Lys Ser Thr Asp Asn Gly Leu Thr Phe Ala His Leu Leu Asp Pro Val
 100 105 110
 Gly Asn His Phe Gly Val Phe Ala Pro Pro Pro Ala Ala
 115 120 125

<210> 77
 <211> 1086

<212> DNA
<213> Bacteria

<220>
<221> CDS
<222> (1)...(1086)

<400> 77

gtg acc gcg gcg ggc ccc gag cgc ctc cac cgg cgc ggc ggc ggc ctc	48
Val Thr Ala Ala Gly Pro Glu Arg Leu His Arg Arg Gly Gly Gly Leu	
1 5 10 15	
ccc cgg ccg acc gga gca ggc gtc cca cgc tcg gcg gag tgg gcc gac	96
Pro Arg Pro Thr Gly Ala Gly Val Pro Arg Ser Ala Glu Trp Ala Asp	
20 25 30	
cgg tac gtg ggc ggc gcc ccg ccg cga cta ggc tct gcc gct gtg tcc	144
Arg Tyr Val Gly Gly Ala Pro Pro Arg Leu Gly Ser Ala Ala Val Ser	
35 40 45	
gac cat gcc agc acg act ccc gcc acc gcc gta cga ccg ccg gtg ctg	192
Asp His Ala Ser Thr Thr Pro Ala Thr Ala Val Arg Pro Pro Val Leu	
50 55 60	
tgc ccc ggc gac acg gtg atg ctg gtg tcg ccg tcg ggg ccg acc cgg	240
Cys Pro Gly Asp Thr Val Met Leu Val Ser Pro Ser Gly Pro Thr Arg	
65 70 75 80	
ccc gag cgg gtg gcc cgg ggc atc gag ctg ctc acc ggc tgg ggg ctg	288
Pro Glu Arg Val Ala Arg Gly Ile Glu Leu Leu Thr Gly Trp Gly Leu	
85 90 95	
cgg ccg gtg ctg gcg ccg aac gcg tac gcc cgg cag ggt tac ctg gcc	336
Arg Pro Val Leu Ala Pro Asn Ala Tyr Ala Arg Gln Gly Tyr Leu Ala	
100 105 110	
ggc gcg gac gag ctg cgc gcc gcc gac ctg aac gcg gcg ttc gcc gac	384
Gly Ala Asp Glu Leu Arg Ala Ala Asp Leu Asn Ala Ala Phe Ala Asp	
115 120 125	
ccc gag gtg cgc ggg gtg atc tgc acg cgc ggc ggg tac ggc gcg cag	432
Pro Glu Val Arg Gly Val Ile Cys Thr Arg Gly Gly Tyr Gly Ala Gln	
130 135 140	
cgg atc gtc gac gcg atc gac atg gcc gcc gta cgc cgg gac ccg aag	480
Arg Ile Val Asp Ala Ile Asp Met Ala Ala Val Arg Arg Asp Pro Lys	
145 150 155 160	
gtg gtc gcc ggg ttc tcc gac atc acc gcg ctg cag ctc gcg ctg tgg	528
Val Val Ala Gly Phe Ser Asp Ile Thr Ala Leu Gln Leu Ala Leu Trp	
165 170 175	
cgg ggc gcc cgg ctg gcc ggc gtg cac ggc ccc ggg gcg gcg tgg ctg	576
Arg Gly Ala Arg Leu Ala Gly Val His Gly Pro Gly Ala Ala Trp Leu	
180 185 190	
gac gag cgc act ccg ctg cgg tcg gcc gag tcg ctg cac gcc gcc ctg	624
Asp Glu Arg Thr Pro Leu Arg Ser Ala Glu Ser Leu His Ala Ala Leu	

	195					200					205					
atg	acc	acc	gaa	ccg	gtg	acg	gtg	acc	gcc	gtc	gcc	gag	gag	gag	acg	672
Met	Thr	Thr	Glu	Pro	Val	Thr	Val	Thr	Ala	Val	Ala	Glu	Glu	Glu	Thr	
	210					215					220					
ttc	ccg	gtg	cgg	gtg	ccc	ggg	cgg	gcc	acc	ggc	ccg	ctg	ctg	ggc	ggc	720
Phe	Pro	Val	Arg	Val	Pro	Gly	Arg	Ala	Thr	Gly	Pro	Leu	Leu	Gly	Gly	
225	230					235					240					
aac	ctc	tgc	ctg	gtc	gtg	gcg	tcg	ctg	ggc	acc	ccg	gac	atg	ccg	gac	768
Asn	Leu	Cys	Leu	Val	Val	Ala	Ser	Leu	Gly	Thr	Pro	Asp	Met	Pro	Asp	
	245					250					255					
ctg	acc	ggc	gcg	atc	ctg	ttg	atc	gag	gac	gtg	cag	gag	ccg	ccg	tac	816
Leu	Thr	Gly	Ala	Ile	Leu	Leu	Ile	Glu	Asp	Val	Gln	Glu	Pro	Pro	Tyr	
	260					265					270					
aag	gtg	gac	cgg	atg	ctc	acc	cag	ttg	cgc	cgg	gcc	ggc	gcg	ctg	gac	864
Lys	Val	Asp	Arg	Met	Leu	Thr	Gln	Leu	Arg	Arg	Ala	Gly	Ala	Leu	Asp	
	275					280					285					
ggg	ctg	gcc	ggg	gtg	gcg	gtc	ggc	cag	ttc	acc	ggc	tgc	gcc	gac	ggc	912
Gly	Leu	Ala	Gly	Val	Ala	Val	Gly	Gln	Phe	Thr	Gly	Cys	Ala	Asp	Gly	
	290					295					300					
tgg	tcg	acc	agc	gtc	gcc	gac	gtg	ctc	tcc	gag	cgc	ctc	ggc	gac	ctc	960
Trp	Ser	Thr	Ser	Val	Ala	Asp	Val	Leu	Ser	Glu	Arg	Leu	Gly	Asp	Leu	
305	310					315					320					
ggc	gtc	ccg	gtc	ctc	ggc	ggc	ctg	ccc	gtc	ggc	cac	ggc	gtc	ggc	cag	1008
Gly	Val	Pro	Val	Leu	Gly	Gly	Leu	Pro	Val	Gly	His	Gly	Val	Gly	Gln	
	325					330					335					
ctc	acc	gtc	ccg	gtc	ggc	acc	gac	gcg	acc	ctc	gac	acg	acg	acg	gcc	1056
Leu	Thr	Val	Pro	Val	Gly	Thr	Asp	Ala	Thr	Leu	Asp	Thr	Thr	Thr	Ala	
	340					345					350					
acc	ctc	acg	gtc	acc	ccc	gcc	gtc	cgc	tga							1086
Thr	Leu	Thr	Val	Thr	Pro	Ala	Val	Arg	*							
	355					360										

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<210> 78
<211> 361
<212> PRT
<213> Bacteria
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<400> 78																
Val	Thr	Ala	Ala	Gly	Pro	Glu	Arg	Leu	His	Arg	Arg	Gly	Gly	Gly	Leu	
1				5					10					15		
Pro	Arg	Pro	Thr	Gly	Ala	Gly	Val	Pro	Arg	Ser	Ala	Glu	Trp	Ala	Asp	
			20					25					30			
Arg	Tyr	Val	Gly	Gly	Ala	Pro	Pro	Arg	Leu	Gly	Ser	Ala	Ala	Val	Ser	
		35					40					45				
Asp	His	Ala	Ser	Thr	Thr	Pro	Ala	Thr	Ala	Val	Arg	Pro	Pro	Val	Leu	
	50					55					60					
Cys	Pro	Gly	Asp	Thr	Val	Met	Leu	Val	Ser	Pro	Ser	Gly	Pro	Thr	Arg	

65					70					75					80
Pro	Glu	Arg	Val	Ala	Arg	Gly	Ile	Glu	Leu	Leu	Thr	Gly	Trp	Gly	Leu
				85					90					95	
Arg	Pro	Val	Leu	Ala	Pro	Asn	Ala	Tyr	Ala	Arg	Gln	Gly	Tyr	Leu	Ala
			100					105					110		
Gly	Ala	Asp	Glu	Leu	Arg	Ala	Ala	Asp	Leu	Asn	Ala	Ala	Phe	Ala	Asp
		115					120				125				
Pro	Glu	Val	Arg	Gly	Val	Ile	Cys	Thr	Arg	Gly	Gly	Tyr	Gly	Ala	Gln
	130					135					140				
Arg	Ile	Val	Asp	Ala	Ile	Asp	Met	Ala	Ala	Val	Arg	Arg	Asp	Pro	Lys
145					150					155					160
Val	Val	Ala	Gly	Phe	Ser	Asp	Ile	Thr	Ala	Leu	Gln	Leu	Ala	Leu	Trp
			165						170					175	
Arg	Gly	Ala	Arg	Leu	Ala	Gly	Val	His	Gly	Pro	Gly	Ala	Ala	Trp	Leu
		180						185					190		
Asp	Glu	Arg	Thr	Pro	Leu	Arg	Ser	Ala	Glu	Ser	Leu	His	Ala	Ala	Leu
	195						200					205			
Met	Thr	Thr	Glu	Pro	Val	Thr	Val	Thr	Ala	Val	Ala	Glu	Glu	Glu	Thr
	210					215					220				
Phe	Pro	Val	Arg	Val	Pro	Gly	Arg	Ala	Thr	Gly	Pro	Leu	Leu	Gly	Gly
225					230					235					240
Asn	Leu	Cys	Leu	Val	Val	Ala	Ser	Leu	Gly	Thr	Pro	Asp	Met	Pro	Asp
			245						250					255	
Leu	Thr	Gly	Ala	Ile	Leu	Leu	Ile	Glu	Asp	Val	Gln	Glu	Pro	Pro	Tyr
		260						265					270		
Lys	Val	Asp	Arg	Met	Leu	Thr	Gln	Leu	Arg	Arg	Ala	Gly	Ala	Leu	Asp
	275						280					285			
Gly	Leu	Ala	Gly	Val	Ala	Val	Gly	Gln	Phe	Thr	Gly	Cys	Ala	Asp	Gly
	290					295					300				
Trp	Ser	Thr	Ser	Val	Ala	Asp	Val	Leu	Ser	Glu	Arg	Leu	Gly	Asp	Leu
305					310					315					320
Gly	Val	Pro	Val	Leu	Gly	Gly	Leu	Pro	Val	Gly	His	Gly	Val	Gly	Gln
			325						330					335	
Leu	Thr	Val	Pro	Val	Gly	Thr	Asp	Ala	Thr	Leu	Asp	Thr	Thr	Thr	Ala
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Thr	Leu	Thr	Val	Thr	Pro	Ala	Val	Arg							
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 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1) ... (861)

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gga ggc gct cgg ggc ccg ccg cgg tca ccg gct agc ctc gac gtc gtg	96
Gly Gly Ala Arg Gly Pro Pro Arg Ser Pro Ala Ser Leu Asp Val Val	
20 25 30	
gct acc gcg ttg gtg atc gag aac gac ccg acc gac gac gtc cgc cgg	144

Ala	Thr	Ala	Leu	Val	Ile	Glu	Asn	Asp	Pro	Thr	Asp	Asp	Val	Arg	Arg		
		35					40					45					
ctc	ggc	gag	tgg	ctg	acc	gag	gcg	ggg	ctc	gac	ctg	tgg	gtc	gtc	cgc	192	
Leu	Gly	Glu	Trp	Leu	Thr	Glu	Ala	Gly	Leu	Asp	Leu	Trp	Val	Val	Arg		
	50					55				60							
gcg	cac	gcc	ggc	gat	cag	ctc	ccc	gcc	gac	ctg	gag	ggc	tac	tcc	gcg	240	
Ala	His	Ala	Gly	Asp	Gln	Leu	Pro	Ala	Asp	Leu	Glu	Gly	Tyr	Ser	Ala		
	65				70					75					80		
ctg	gtg	gtg	ctg	ggc	ggc	gag	cag	cag	gcg	tac	ccg	ctg	ccc	gac	ggc	288	
Leu	Val	Val	Leu	Gly	Gly	Glu	Gln	Gln	Ala	Tyr	Pro	Leu	Pro	Asp	Gly		
				85				90						95			
tgc	ccc	ggc	gcg	ccc	tgg	ttc	ccc	gcc	gtc	gag	ggg	ctg	ctc	cgc	aag	336	
Ser	Pro	Gly	Ala	Pro	Trp	Phe	Pro	Ala	Val	Glu	Gly	Leu	Leu	Arg	Lys		
		100					105						110				
gcc	gtc	cgg	gac	cgg	gtg	ccc	acc	ctg	ggc	atc	tgc	ctg	ggc	gcg	cag	384	
Ala	Val	Arg	Asp	Arg	Val	Pro	Thr	Leu	Gly	Ile	Cys	Leu	Gly	Ala	Gln		
		115				120						125					
ttg	ctg	gcg	acc	gcc	cac	gcc	ggc	gag	gtc	gag	cgc	agc	gcg	tcc	ggg	432	
Leu	Leu	Ala	Thr	Ala	His	Ala	Gly	Glu	Val	Glu	Arg	Ser	Ala	Ser	Gly		
	130					135					140						
ccg	gag	gtc	ggg	ccc	ggg	gtg	gtc	ggc	aag	cgg	gac	gcc	gcc	gac	gcc	480	
Pro	Glu	Val	Gly	Pro	Gly	Val	Val	Gly	Lys	Arg	Asp	Ala	Ala	Asp	Ala		
	145				150				155						160		
gac	ccg	ctg	ttc	cgc	tac	gtc	ccg	ctg	atc	ccc	gac	gtg	ctc	cag	tgg	528	
Asp	Pro	Leu	Phe	Arg	Tyr	Val	Pro	Leu	Ile	Pro	Asp	Val	Leu	Gln	Trp		
				165				170						175			
cac	gcc	gac	gag	atc	acc	gag	ctg	ccc	cgg	ggc	gcc	acc	ctg	ctg	gcc	576	
His	Ala	Asp	Glu	Ile	Thr	Glu	Leu	Pro	Arg	Gly	Ala	Thr	Leu	Leu	Ala		
			180					185					190				
gcc	tcc	acc	cgc	tac	ccg	cac	cag	gcg	ttc	cgc	ctc	ggc	gac	cgg	gcc	624	
Ala	Ser	Thr	Arg	Tyr	Pro	His	Gln	Ala	Phe	Arg	Leu	Gly	Asp	Arg	Ala		
		195				200						205					
tgg	ggg	ctg	cag	ttc	cac	atc	gag	tgc	gac	acc	gcg	atg	atc	gcc	gac	672	
Trp	Gly	Leu	Gln	Phe	His	Ile	Glu	Cys	Asp	Thr	Ala	Met	Ile	Ala	Asp		
	210					215					220						
tgg	gcc	acc	gac	tgc	acg	ctg	ctg	gcc	gag	ctg	ggc	tac	gac	ccg	gac	720	
Trp	Ala	Thr	Asp	Ser	Thr	Leu	Leu	Ala	Glu	Leu	Gly	Tyr	Asp	Pro	Asp		
	225				230					235					240		
ctg	gtg	gtg	gcg	gcc	tgc	cac	gcg	gtg	atg	gtc	gac	gtc	gag	gag	gtc	768	
Leu	Val	Val	Ala	Ala	Cys	His	Ala	Val	Met	Val	Asp	Val	Glu	Glu	Val		
			245					250						255			
tgg	cag	ccg	ttc	gcc	gcc	cgg	ttc	gcc	gcg	ctg	gct	ctc	ggc	gag	ctg	816	
Trp	Gln	Pro	Phe	Ala	Ala	Arg	Phe	Ala	Ala	Leu	Ala	Leu	Gly	Glu	Leu		
			260					265					270				

gac	gac	gac	acg	tcc	cgc	cgc	agc	ctg	ccg	ctg	ctc	ggg	cag	tga	861
Asp	Asp	Asp	Thr	Ser	Arg	Arg	Ser	Leu	Pro	Leu	Leu	Gly	Gln	*	
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<210> 80
 <211> 286
 <212> PRT
 <213> Bacteria

<400> 80															
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			20				25						30		
Ala	Thr	Ala	Leu	Val	Ile	Glu	Asn	Asp	Pro	Thr	Asp	Asp	Val	Arg	Arg
			35				40						45		
Leu	Gly	Glu	Trp	Leu	Thr	Glu	Ala	Gly	Leu	Asp	Leu	Trp	Val	Val	Arg
			50			55					60				
Ala	His	Ala	Gly	Asp	Gln	Leu	Pro	Ala	Asp	Leu	Glu	Gly	Tyr	Ser	Ala
65					70					75					80
Leu	Val	Val	Leu	Gly	Glu	Gln	Gln	Ala	Tyr	Pro	Leu	Pro	Asp	Gly	
			85					90					95		
Ser	Pro	Gly	Ala	Pro	Trp	Phe	Pro	Ala	Val	Glu	Gly	Leu	Leu	Arg	Lys
			100					105					110		
Ala	Val	Arg	Asp	Arg	Val	Pro	Thr	Leu	Gly	Ile	Cys	Leu	Gly	Ala	Gln
			115				120						125		
Leu	Leu	Ala	Thr	Ala	His	Ala	Gly	Glu	Val	Glu	Arg	Ser	Ala	Ser	Gly
			130			135						140			
Pro	Glu	Val	Gly	Pro	Gly	Val	Val	Gly	Lys	Arg	Asp	Ala	Ala	Asp	Ala
					150					155					160
Asp	Pro	Leu	Phe	Arg	Tyr	Val	Pro	Leu	Ile	Pro	Asp	Val	Leu	Gln	Trp
			165					170						175	
His	Ala	Asp	Glu	Ile	Thr	Glu	Leu	Pro	Arg	Gly	Ala	Thr	Leu	Leu	Ala
			180					185					190		
Ala	Ser	Thr	Arg	Tyr	Pro	His	Gln	Ala	Phe	Arg	Leu	Gly	Asp	Arg	Ala
			195				200					205			
Trp	Gly	Leu	Gln	Phe	His	Ile	Glu	Cys	Asp	Thr	Ala	Met	Ile	Ala	Asp
			210			215					220				
Trp	Ala	Thr	Asp	Ser	Thr	Leu	Leu	Ala	Glu	Leu	Gly	Tyr	Asp	Pro	Asp
					230					235					240
Leu	Val	Val	Ala	Ala	Cys	His	Ala	Val	Met	Val	Asp	Val	Glu	Glu	Val
				245					250					255	
Trp	Gln	Pro	Phe	Ala	Ala	Arg	Phe	Ala	Ala	Leu	Ala	Leu	Gly	Glu	Leu
			260				265						270		
Asp	Asp	Asp	Thr	Ser	Arg	Arg	Ser	Leu	Pro	Leu	Leu	Gly	Gln		
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 <211> 3033
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS

<222> (1)...(3033)

<400> 81

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ttc ggc atc gtc ggc ggc gac ggc gcc acc cgc gcc gcc gac ctg ctc	96
Phe Gly Ile Val Gly Gly Asp Gly Ala Thr Arg Ala Ala Asp Leu Leu	
20 25 30	
ggc ccc gac ggg ctg ggc ctg tgg cgg ccg gac gtg cag gag ccg acc	144
Gly Pro Asp Gly Leu Gly Leu Trp Arg Pro Asp Val Gln Glu Pro Thr	
35 40 45	
gac gac cgc gcg gcg gag ctg ctc gcc gcg ctc tcc cgg gcc gcc gac	192
Asp Asp Arg Ala Ala Glu Leu Leu Ala Ala Leu Ser Arg Ala Ala Asp	
50 55 60	
ccg gac ctg gcg ctg cgc cag ctc cac cgc atc gtc gag gcg gag cgc	240
Pro Asp Leu Ala Leu Arg Gln Leu His Arg Ile Val Glu Ala Glu Arg	
65 70 75 80	
cgg gcc gcc ggt ccg gcg gcc acc ggt tcc gcg ctg gtg gag gcg ctc	288
Arg Ala Ala Gly Pro Ala Ala Thr Gly Ser Ala Leu Val Glu Ala Leu	
85 90 95	
gcg gac gac ccg ggg ctg cgc cgc cgg ctg atc gcc gtc ctc ggc gcc	336
Ala Asp Asp Pro Gly Leu Arg Arg Arg Leu Ile Ala Val Leu Gly Ala	
100 105 110	
tcc tcc gcg ctg ggc gac cac ctg gtc gcc aac ccc gac cag tgg ccg	384
Ser Ser Ala Leu Gly Asp His Leu Val Ala Asn Pro Asp Gln Trp Pro	
115 120 125	
gcc ctg cgg acc gcc ccg gac ggg ctc gcg ccg acc gcg gag ggc cgg	432
Ala Leu Arg Thr Ala Pro Asp Gly Leu Ala Pro Thr Ala Glu Gly Arg	
130 135 140	
ctc gac ctg tcc ggc gac ggg cag ccg gtc gcg gtg ctg cgc aag gcg	480
Leu Asp Leu Ser Gly Asp Gly Gln Pro Val Ala Val Leu Arg Lys Ala	
145 150 155 160	
tac cgg ctg gcg ctg ctg ccg atc gcg gcg gcc gac ctg acc ggc gac	528
Tyr Arg Leu Ala Leu Leu Arg Ile Ala Ala Ala Asp Leu Thr Gly Asp	
165 170 175	
cgg ggc ctg gag cag acg atg gcc gcg ctc tcc gcg ttg gcc gac gcg	576
Arg Gly Leu Glu Gln Thr Met Ala Ala Leu Ser Ala Leu Ala Asp Ala	
180 185 190	
acc ctg gcg gcg gcg tac gag atc gcc gtc ggc gag ctg ccg gag ggc	624
Thr Leu Ala Ala Tyr Glu Ile Ala Val Gly Glu Leu Pro Glu Gly	
195 200 205	
acg ccc cgg ccc cgg ctc gcc gtc gtg gcg atg ggc aag tgc ggc ggt	672
Thr Pro Arg Pro Arg Leu Ala Val Val Ala Met Gly Lys Cys Gly Gly	
210 215 220	

gac Asp 225	gag Glu	ctg Leu	aac Asn	tac Tyr	gtc Val 230	tcc Ser	gac Asp	gtc Val	gac Asp	gtg Val 235	atc Ile	ttc Phe	gtg Val	gcc Ala 240	gcc Ala	720
gag Glu	gac Asp	gac Asp	gac Asp	ctc Leu 245	gcc Ala	gcg Ala	gcc Ala	acc Thr	acg Thr	gtc Val 250	gcc Ala	acc Thr	cgg Arg	ctg Leu 255	atc Ile	768
cac His	gtc Val	tgc Cys	ggg Gly 260	ctg Leu	gtc Val	gcc Ala	tgg Trp	ccg Pro 265	gtc Val	gac Asp	gcc Ala	gcc Ala	ctg Leu 270	cgg Arg	ccc Pro	816
gag Glu	ggc Gly	aat Asn 275	cgt Arg	ggc Gly	ccg Pro	ctg Leu	gtg Val 280	cgc Arg	acc Thr	ctg Leu	gcc Ala	agc Ser 285	cac His	ctc Leu	gcc Ala	864
tac Tyr 290	tac Tyr	cgg Arg	cgc Arg	tgg Trp	gcg Ala 295	cgg Arg	acg Thr	tgg Trp	gag Glu	ttc Phe 300	cag Gln	gcg Ala	ctg Leu	ctc Leu	aag Lys	912
gcc Ala 305	cgg Arg	ccg Pro	gcg Ala	gcc Ala	ggc Gly 310	gac Asp	ctg Leu	acc Thr	ctg Leu	ggc Gly 315	cgg Arg	gag Glu	tgg Trp	atc Ile 320	gac Asp	960
cag Gln	ctc Leu	gcc Ala	ccg Pro	ctc Leu 325	gtg Val	tgg Trp	cgg Arg	gcc Ala	gcc Ala 330	gag Glu	cgc Arg	ccc Pro	gag Glu 335	gcg Ala	gtc Val	1008
gag Glu	gac Asp	gtc Val	cgc Arg	gcc Ala	atg Met	cgg Arg	cgg Arg	aag Lys 345	atc Ile	atc Ile	gac Asp	aac Asn	gtc Val 350	ccg Pro	ccg Pro	1056
aag Lys	gag Glu	ttg Leu 355	gag Glu	cgc Arg	gag Glu	atc Ile	aag Lys 360	cgc Arg	ggc Gly	ccg Pro	ggc Gly	ggg Gly 365	ctg Leu	cgc Arg	gac Asp	1104
atc Ile 370	gag Glu	ttc Phe	gcc Ala	gtc Val	cag Gln	ctg Leu 375	ctg Leu	caa Gln	ctg Leu	gtg Val 380	cac His	ggc Gly	cgg Arg	ggc Gly	gac Asp	1152
gag Glu 385	tcg Ser	ctg Leu	cgg Arg	acg Thr	ccc Pro 390	ggc Gly	acc Thr	gtc Val	ccg Pro	gcg Ala 395	ctg Leu	cgc Arg	gcg Ala	ctc Leu	gtc Val 400	1200
gcc Ala	ggc Gly	ggc Gly	tac Tyr	gtc Val 405	ggc Gly	cgg Arg	gcc Ala	gac Asp	ggg Gly 410	gag Glu	gcg Ala	ctg Leu	ctg Leu	cgc Arg	ggc Gly	1248
tac Tyr	cgc Arg	ttc Phe	ctg Leu 420	cgc Arg	ggc Gly	gtc Val	gag Glu	cac His 425	cgc Arg	ctc Leu	cag Gln	ctc Leu	cag Gln	ggg Gly	ctg Leu	1296
cgc Arg	cgc Arg	acc Thr 435	cac His	acc Thr	gtg Val	ccg Pro	acc Thr	gag Glu 440	ccg Pro	gcc Ala	gcg Ala	ctg Leu 445	cgc Arg	tgg Trp	ttg Leu	1344
gcc	gcc	gcg	ctg	ggc	tac	gcg	gcc	acg	ccg	ggc	cgc	agc	gcc	gtc	gag	1392

Ala	Ala	Ala	Leu	Gly	Tyr	Ala	Ala	Thr	Pro	Gly	Arg	Ser	Ala	Val	Glu		
450						455					460						
gag	ttc	cgc	gcc	gag	tgg	gtc	acc	cac	gcc	acc	gag	gta	cgc	cgg	ctg	1440	
Glu	Phe	Arg	Ala	Glu	Trp	Val	Thr	His	Ala	Thr	Glu	Val	Arg	Arg	Leu		
465					470					475					480		
cac	gcc	aag	ctg	ctc	tac	cgg	ccg	ctg	ctg	gag	tcg	gtg	gcc	cgg	gtg	1488	
His	Ala	Lys	Leu	Leu	Tyr	Arg	Pro	Leu	Leu	Glu	Ser	Val	Ala	Arg	Val		
			485						490					495			
ccg	gcc	gac	ggg	ctg	cgg	ctg	acc	ccg	gag	gcg	gcc	cgg	cac	cgg	ctg	1536	
Pro	Ala	Asp	Gly	Leu	Arg	Leu	Thr	Pro	Glu	Ala	Ala	Arg	His	Arg	Leu		
			500					505					510				
gag	atc	ctc	ggc	ttc	gcc	gac	ccc	gcc	ggg	gcg	ctg	cgg	cac	ctc	cag	1584	
Glu	Ile	Leu	Gly	Phe	Ala	Asp	Pro	Ala	Gly	Ala	Leu	Arg	His	Leu	Gln		
		515					520					525					
gcc	ctc	acc	ggc	ggg	gtg	agc	cgc	acg	gcg	gcc	atc	cag	cgc	acc	ctg	1632	
Ala	Leu	Thr	Gly	Gly	Val	Ser	Arg	Thr	Ala	Ala	Ile	Gln	Arg	Thr	Leu		
		530				535					540						
ctg	ccg	gtg	ctg	ctc	agc	gag	ttc	gcc	gac	gcc	ccc	gag	ccg	gac	cgc	1680	
Leu	Pro	Val	Leu	Leu	Ser	Glu	Phe	Ala	Asp	Ala	Pro	Glu	Pro	Asp	Arg		
545					550					555					560		
ggc	ctg	ctc	aac	tac	cgg	cag	gtc	tcc	gac	aag	ctc	ggc	agc	acg	ccc	1728	
Gly	Leu	Leu	Asn	Tyr	Arg	Gln	Val	Ser	Asp	Lys	Leu	Gly	Ser	Thr	Pro		
			565						570					575			
tgg	tac	ctg	cgc	ctg	ctg	cgc	gac	tcc	ggg	ccg	gtg	gcc	cgc	cgg	ctg	1776	
Trp	Tyr	Leu	Arg	Leu	Leu	Arg	Asp	Ser	Gly	Pro	Val	Ala	Arg	Arg	Leu		
			580					585					590				
gcc	cgg	gtg	ctc	tcc	tcc	tcc	cgc	tac	gcc	gcc	gac	ctg	ctg	gcc	cgc	1824	
Ala	Arg	Val	Leu	Ser	Ser	Ser	Arg	Tyr	Ala	Ala	Asp	Leu	Leu	Ala	Arg		
		595					600					605					
gag	ccg	gag	gcg	ctg	cgg	atg	ctg	gcc	gag	gag	agc	gag	ttg	acc	ccc	1872	
Glu	Pro	Glu	Ala	Leu	Arg	Met	Leu	Ala	Glu	Glu	Ser	Glu	Leu	Thr	Pro		
		610				615					620						
cgg	ccg	agc	ggg	gtg	ctc	tgc	gag	ggc	ttc	gcc	gcc	gcc	gca	gcc	cgg	1920	
Arg	Pro	Ser	Gly	Val	Leu	Cys	Glu	Gly	Phe	Ala	Ala	Ala	Ala	Ala	Arg		
625					630				635						640		
cac	gcc	gac	ccc	gtc	gaa	gcc	acc	cgg	gcg	atc	cgc	gcg	ctg	cgc	cgc	1968	
His	Ala	Asp	Pro	Val	Glu	Ala	Thr	Arg	Ala	Ile	Arg	Ala	Leu	Arg	Arg		
			645						650					655			
cgg	gag	ctg	gtc	cgc	atc	gcc	tgc	gcg	gac	ctg	ttg	agc	cgg	gcc	ggc	2016	
Arg	Glu	Leu	Val	Arg	Ile	Ala	Cys	Ala	Asp	Leu	Leu	Ser	Arg	Ala	Gly		
			660				665						670				
tcg	ctg	gcc	ccg	tcg	ccg	ccc	cgg	ccc	gac	ggc	ggg	cgg	gcc	gcg	ctc	2064	
Ser	Leu	Ala	Pro	Ser	Pro	Pro	Arg	Pro	Asp	Gly	Gly	Arg	Ala	Ala	Leu		
		675					680					685					

ggt ctc gcc gac gtc gcc gcc gtg ggc acg gcg ctg gcc gac gtc acc	2112
Gly Leu Ala Asp Val Ala Ala Val Gly Thr Ala Leu Ala Asp Val Thr	
690 695 700	
gac gcc acc ctg gcc gcg gcg ctg cgg gcc gcc cgg gcc gcc cag ccg	2160
Asp Ala Thr Leu Ala Ala Leu Arg Ala Ala Arg Ala Ala Gln Pro	
705 710 715 720	
ccc atg ccg ggg ctg cgc ttc gcc gtg atc ggc atg ggc cgc ctg ggc	2208
Pro Met Pro Gly Leu Arg Phe Ala Val Ile Gly Met Gly Arg Leu Gly	
725 730 735	
ggg tac gag tcg aac tac ctc tcc gac gcc gac gtg ctc ttc gtc tac	2256
Gly Tyr Glu Ser Asn Tyr Leu Ser Asp Ala Asp Val Leu Phe Val Tyr	
740 745 750	
gac ccc ccg ccc ggc gcc ggc gag agc gcg gcc ggc gcg gcg agc gcc	2304
Asp Pro Pro Pro Gly Ala Gly Glu Ser Ala Ala Gly Ala Ala Ser Ala	
755 760 765	
gcc gcc cac ggg atc gcc gag gag ttg cgt cgg ctg ctc ggc atg ccc	2352
Ala Ala His Gly Ile Ala Glu Glu Leu Arg Arg Leu Leu Gly Met Pro	
770 775 780	
gcg ccc gac ccg ccg ctg ggc gtg gac gcc gac ctg cgt ccc gag ggc	2400
Ala Pro Asp Pro Pro Leu Gly Val Asp Ala Asp Leu Arg Pro Glu Gly	
785 790 795 800	
cgg cag ggt ccg ctc gtg cgc agc ctc gcc gcg tac gcg cag tac tac	2448
Arg Gln Gly Pro Leu Val Arg Ser Leu Ala Ala Tyr Ala Gln Tyr Tyr	
805 810 815	
gcc cgc tgg tcg aag gtg tgg gag gcg cag gcg ctg ctg cgt gcc ccg	2496
Ala Arg Trp Ser Lys Val Trp Glu Ala Gln Ala Leu Leu Arg Ala Arg	
820 825 830	
ttc gtc tgc ggc gac gcc gac ctc ggc gcg gag ttc gag gcg atg gtc	2544
Phe Val Cys Gly Asp Ala Asp Leu Gly Ala Glu Phe Glu Ala Met Val	
835 840 845	
gac ccg gtc cgc tac ccg gcc gac ggg ttg acc cgc gag cag gtg gtg	2592
Asp Pro Val Arg Tyr Pro Ala Asp Gly Leu Thr Arg Glu Gln Val Val	
850 855 860	
gag atc ccg ccg atc aag gcg ccg gtg gag cac gag ccg ctg ccc ccg	2640
Glu Ile Arg Arg Ile Lys Ala Arg Val Glu His Glu Arg Leu Pro Arg	
865 870 875 880	
ggc gcc gac ccg gcc acc cac acc aag ctc ggg ccg ggc ggc ctc gcc	2688
Gly Ala Asp Pro Ala Thr His Thr Lys Leu Gly Arg Gly Gly Leu Ala	
885 890 895	
gac gtc gag tgg gcg gtg caa ctg ctc cag ctc ccg cac gcc ggg acg	2736
Asp Val Glu Trp Ala Val Gln Leu Leu Gln Leu Arg His Ala Gly Thr	
900 905 910	
gtc ccg ccg ctg cgc ggc acg cgt acg ctc gac gcc ctc gcg gcg gcc	2784

Val	Pro	Arg	Leu	Arg	Gly	Thr	Arg	Thr	Leu	Asp	Ala	Leu	Ala	Ala	Ala		
	915						920					925					
cgg	gac	gcg	ggg	ctg	gtc	gac	ccg	acg	gac	gcc	acc	gag	atg	gcg	gcc	2832	
Arg	Asp	Ala	Gly	Leu	Val	Asp	Pro	Thr	Asp	Ala	Thr	Glu	Met	Ala	Ala		
	930					935					940						
ggc	tgg	acc	ctg	gcc	gcg	cag	gtc	cgc	aac	gcg	ctg	atg	ctg	gtc	cgc	2880	
Gly	Trp	Thr	Leu	Ala	Ala	Gln	Val	Arg	Asn	Ala	Leu	Met	Leu	Val	Arg		
	945				950					955					960		
ggc	cgg	gcc	ggc	gac	cag	ttg	ccc	cgg	cac	ggc	gtc	gag	ttg	gcc	ggg	2928	
Gly	Arg	Ala	Gly	Asp	Gln	Leu	Pro	Arg	His	Gly	Val	Glu	Leu	Ala	Gly		
				965					970					975			
gtg	gtc	cgg	ctg	ctc	ggc	cgg	gac	gat	ccc	ggc	gag	ttc	ctc	gac	gag	2976	
Val	Val	Arg	Leu	Leu	Gly	Arg	Asp	Asp	Pro	Gly	Glu	Phe	Leu	Asp	Glu		
			980				985						990				
tac	ctg	cgc	acc	ggc	cgc	cgc	tcc	cgc	gcg	gcg	atg	gag	cgg	gtc	ctc	3024	
Tyr	Leu	Arg	Thr	Gly	Arg	Arg	Ser	Arg	Ala	Ala	Met	Glu	Arg	Val	Leu		
		995					1000					1005					
gac	gcc	tga														3033	
Asp	Ala	*															
	1010																

<210> 82
 <211> 296
 <212> PRT
 <213> Bacteria

<400> 82

Val	Ile	Leu	Val	Ala	Leu	Ala	Lys	Ile	Arg	Glu	Val	Pro	Leu	Thr	Gly		
1				5					10					15			
Ala	Asp	Ala	Gly	Pro	Tyr	Gly	Val	Thr	Val	Gly	Pro	Asp	Gly	Ala	Leu		
			20					25					30				
Trp	Leu	Thr	Leu	Val	His	Ala	Gly	Ala	Val	Ala	Arg	Val	Gly	Ala	Asp		
		35					40					45					
Gly	Asp	Leu	Arg	Thr	Trp	Gln	Val	Ala	Ala	Asp	Ser	Arg	Pro	Leu	Ile		
	50					55					60						
Val	Thr	Pro	Gly	Pro	Asp	Gly	Ala	Leu	Trp	Phe	Thr	Arg	Ser	Gly	Asp		
65					70					75					80		
Asp	Arg	Ile	Gly	Arg	Ile	Thr	Thr	Asp	Gly	Glu	Gln	Ser	Ala	Val	Ala		
				85				90						95			
Leu	Pro	Pro	Gly	Ser	Gly	Pro	Cys	Gly	Ile	Ala	Ala	Gly	Pro	Asp	Gly		
			100					105					110				
Ala	Leu	Trp	Tyr	Ala	Ala	Met	Thr	Ala	Asp	Ala	Val	Gly	Arg	Val	Thr		
		115					120					125					
Thr	Asp	Gly	Lys	Val	Thr	Gln	Phe	Pro	Leu	Pro	Val	Ser	Gly	Gly	Phe		
	130					135					140						
Ala	Ser	Met	Val	Ala	Ala	Gly	Pro	Asp	Glu	Ala	Val	Trp	Phe	Thr	Leu		
				150					155						160		
Asn	Gln	Ala	Asn	Ala	Val	Gly	Arg	Ile	Gly	Thr	Asp	Gly	Ala	Val	Ala		
			165					170						175			
Leu	His	Pro	Leu	Pro	Thr	Glu	Gly	Ala	Ala	Pro	Val	Gly	Ile	Thr	Ala		
			180					185						190			

Gly Ala Asp Gly Ala Leu Trp Phe Val Glu Ile Gly Ala Gly Gln Leu
 195 200 205
 Gly Arg Ile Thr Pro Asp Gly Arg Ile Asp Glu Tyr Pro Leu Pro Asp
 210 215 220
 Arg Ala Ala Arg Pro His Ala Ile Val Ala Asp Pro Ala Gly Gly Cys
 225 230 235 240
 Trp Phe Thr Glu Trp Gly Gly Asn Arg Ile Gly His Val Ala Pro Asp
 245 250 255
 Gly Thr Ile Val Thr His Asp Leu Pro Thr Pro Ala Ala Glu Pro His
 260 265 270
 Gly Ile Thr Val Ala Pro Asp Gly Thr Val Trp Ala Ala Leu Glu Thr
 275 280 285
 Gly Ala Leu Ala His Leu Thr Pro
 290 295

<210> 83
 <211> 705
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1) ... (705)

<400> 83
 gtg cga cac gac gga acg gcc ggg gag cac cgg cac gac agg acg gcg 48
 Val Arg His Asp Gly Thr Ala Gly Glu His Arg His Asp Arg Thr Ala
 1 5 10 15

 gcg ccg gtg gac gac cat tgg cgg cac ccg gac gtg gac gag gag acc 96
 Ala Pro Val Asp Asp His Trp Arg His Pro Asp Val Asp Glu Glu Thr
 20 25 30

 gct cgg tac tgg gag gag ctc tac ggg cgg cgc gac cgg tac tgg agc 144
 Ala Arg Tyr Trp Glu Glu Leu Tyr Gly Arg Arg Asp Arg Tyr Trp Ser
 35 40 45

 ggg cgg gcg aac ccg atc ctg gtc gac gtc gcc ggg ccg ctg ccg gcc 192
 Gly Arg Ala Asn Pro Ile Leu Val Asp Val Ala Gly Pro Leu Pro Ala
 50 55 60

 ggc acc gcg ctg gac ctc ggc tgc ggc gag ggc ggc gac gcg atc tgg 240
 Gly Thr Ala Leu Asp Leu Gly Cys Gly Glu Gly Gly Asp Ala Ile Trp
 65 70 75 80

 ctg gcc ggg cgg ggc tgg cgg gtg acg gcg gtg gac gtc gcc gag acc 288
 Leu Ala Gly Arg Gly Trp Arg Val Thr Ala Val Asp Val Ala Glu Thr
 85 90 95

 gcc ctc gac cgg gcg tcc gca gcg gcg gcc gag gcc ggg gtg gcg tcc 336
 Ala Leu Asp Arg Ala Ser Ala Ala Ala Glu Ala Gly Val Ala Ser
 100 105 110

 cgc atc gag ttc cgc cgg cac gac ctc acc cgg acc ttc ccg ccg ggc 384
 Arg Ile Glu Phe Arg Arg His Asp Leu Thr Arg Thr Phe Pro Pro Gly
 115 120 125

gag	ttc	gac	ctg	gtc	tcc	gcg	cag	ttc	ctc	cag	tcg	ccg	ctg	gag	ttc	432											
Glu	Phe	Asp	Leu	Val	Ser	Ala	Gln	Phe	Leu	Gln	Ser	Pro	Leu	Glu	Phe												
						130							135							140							
ccc	cgg	gga	gag	gtg	ctg	cgc	tcg	gcg	gcc	cgg	gcc	gtg	gcc	ccc	ggc	480											
Pro	Arg	Gly	Glu	Val	Leu	Arg	Ser	Ala	Ala	Arg	Ala	Val	Ala	Pro	Gly												
						145							150							155							160
ggc	cgg	ctg	ctc	gtc	gtc	gag	cac	ggc	gag	gtc	ccg	ccg	tgg	gga	cgg	528											
Gly	Arg	Leu	Leu	Val	Val	Glu	His	Gly	Glu	Val	Pro	Pro	Trp	Gly	Arg												
						165							170							175							
cac	gcg	cac	ccg	gac	gtg	cgc	ttc	ccc	acc	ccg	cag	gag	acc	ctc	gcc	576											
His	Ala	His	Pro	Asp	Val	Arg	Phe	Pro	Thr	Pro	Gln	Glu	Thr	Leu	Ala												
						180							185							190							
gag	ctg	gac	ctc	gac	ccg	gac	cgg	tgg	ctc	acc	gag	cgg	ctc	gac	gcc	624											
Glu	Leu	Asp	Leu	Asp	Pro	Asp	Arg	Trp	Leu	Thr	Glu	Arg	Leu	Asp	Ala												
						195							200							205							
ccg	cgc	cgg	cag	gcc	acc	ggc	ccg	gac	ggc	cat	acc	ggg	acc	ctc	gtc	672											
Pro	Arg	Arg	Gln	Ala	Thr	Gly	Pro	Asp	Gly	His	Thr	Gly	Thr	Leu	Val												
						210							215							220							
gac	cac	gtg	gtg	ctg	gtc	cgc	cgc	cgc	ccg	tag											705						
Asp	His	Val	Val	Leu	Val	Arg	Arg	Arg	Pro	*																	
						225							230														

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<210> 84
<211> 234
<212> PRT
<213> Bacteria
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<400> 84

Val	Arg	His	Asp	Gly	Thr	Ala	Gly	Glu	His	Arg	His	Asp	Arg	Thr	Ala
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Ala	Pro	Val	Asp	Asp	His	Trp	Arg	His	Pro	Asp	Val	Asp	Glu	Glu	Thr
			20					25					30		
Ala	Arg	Tyr	Trp	Glu	Glu	Leu	Tyr	Gly	Arg	Arg	Asp	Arg	Tyr	Trp	Ser
		35					40					45			
Gly	Arg	Ala	Asn	Pro	Ile	Leu	Val	Asp	Val	Ala	Gly	Pro	Leu	Pro	Ala
		50				55					60				
Gly	Thr	Ala	Leu	Asp	Leu	Gly	Cys	Gly	Glu	Gly	Gly	Asp	Ala	Ile	Trp
65					70					75					80
Leu	Ala	Gly	Arg	Gly	Trp	Arg	Val	Thr	Ala	Val	Asp	Val	Ala	Glu	Thr
				85					90					95	
Ala	Leu	Asp	Arg	Ala	Ser	Ala	Ala	Ala	Ala	Glu	Ala	Gly	Val	Ala	Ser
			100					105					110		
Arg	Ile	Glu	Phe	Arg	Arg	His	Asp	Leu	Thr	Arg	Thr	Phe	Pro	Pro	Gly
		115					120					125			
Glu	Phe	Asp	Leu	Val	Ser	Ala	Gln	Phe	Leu	Gln	Ser	Pro	Leu	Glu	Phe
		130				135					140				
Pro	Arg	Gly	Glu	Val	Leu	Arg	Ser	Ala	Ala	Arg	Ala	Val	Ala	Pro	Gly
145					150					155				160	
Gly	Arg	Leu	Leu	Val	Val	Glu	His	Gly	Glu	Val	Pro	Pro	Trp	Gly	Arg
				165					170					175	
His	Ala	His	Pro	Asp	Val	Arg	Phe	Pro	Thr	Pro	Gln	Glu	Thr	Leu	Ala

			180					185					190				
Glu	Leu	Asp	Leu	Asp	Pro	Asp	Arg	Trp	Leu	Thr	Glu	Arg	Leu	Asp	Ala		
		195					200					205					
Pro	Arg	Arg	Gln	Ala	Thr	Gly	Pro	Asp	Gly	His	Thr	Gly	Thr	Leu	Val		
	210					215					220						
Asp	His	Val	Val	Leu	Val	Arg	Arg	Arg	Pro								
225					230												

<210> 85

<211> 1320

<212> DNA

<213> .

<220>

<221> CDS

<222> (1)...(1320)

<400> 85

gtg	ggc	atg	cgg	cgc	agt	cgg	gtg	gtg	gcg	gtg	gcc	gcc	gcg	tcc	gcc		48
Val	Gly	Met	Arg	Arg	Ser	Arg	Val	Val	Ala	Val	Ala	Ala	Ala	Ser	Ala		
1				5					10					15			
gtg	ctc	ctc	ggc	gtg	acg	tat	ctc	gct	ctt	ccg	ccg	acc	ggg	tcc	gac		96
Val	Leu	Leu	Gly	Val	Thr	Tyr	Leu	Ala	Leu	Pro	Pro	Thr	Gly	Ser	Asp		
			20					25					30				
ctc	gcc	gcg	cag	gtc	gcc	cgg	gcc	gac	ttc	ttc	gcc	gcc	cac	ggc	ctc		144
Leu	Ala	Ala	Gln	Val	Ala	Arg	Ala	Asp	Phe	Phe	Ala	Ala	His	Gly	Leu		
			35				40					45					
gcc	ccg	gtc	gac	ctg	cgc	tgg	tac	ggc	ggg	gtc	cag	cag	ttc	ggc	tac		192
Ala	Pro	Val	Asp	Leu	Arg	Trp	Tyr	Gly	Gly	Val	Gln	Gln	Phe	Gly	Tyr		
	50					55					60						
agc	ctg	gtc	tcc	cag	ccg	gtg	atg	gcg	ctg	ctc	ggg	gtg	cgg	gtc	acc		240
Ser	Leu	Val	Ser	Gln	Pro	Val	Met	Ala	Leu	Leu	Gly	Val	Arg	Val	Thr		
65					70					75					80		
ggc	gtg	ctg	gcg	ctg	gtg	gcg	gcg	gcg	acc	gcg	ttc	gcg	gcg	ctg	ctg		288
Gly	Val	Leu	Ala	Leu	Val	Ala	Ala	Ala	Thr	Ala	Phe	Ala	Ala	Leu	Leu		
				85				90						95			
gtg	cgc	acc	ggg	gtg	ccg	cgc	ccg	ctg	ctc	ggc	agc	ctg	gtc	ggg	gtg		336
Val	Arg	Thr	Gly	Val	Pro	Arg	Pro	Leu	Leu	Gly	Ser	Leu	Val	Gly	Val		
			100					105					110				
gtc	acg	atc	gcc	ggc	aac	ctg	gtc	tgc	ggc	cgg	gtg	acg	tac	ggc	ctc		384
Val	Thr	Ile	Ala	Gly	Asn	Leu	Val	Ser	Gly	Arg	Val	Thr	Tyr	Gly	Leu		
		115					120					125					
ggg	gtg	gcc	ttc	ggc	ctc	ggc	gcg	ctg	ctc	gcc	ctc	acc	ctc	ccc	cgc		432
Gly	Val	Ala	Phe	Gly	Leu	Gly	Ala	Leu	Leu	Ala	Leu	Thr	Leu	Pro	Arg		
	130					135					140						
ggc	ccg	gcc	gca	cgg	gcc	gcc	gac	tcc	gac	ccg	gcc	gca	ccg	gcc	gac		480
Gly	Pro	Ala	Ala	Arg	Ala	Ala	Asp	Ser	Asp	Pro	Ala	Ala	Pro	Ala	Asp		
145					150					155					160		

tcc gac gcc gac ggg cgg gcg cgg cga cgg cag gtc gcg cgg ctc ggg	528
Ser Asp Ala Asp Gly Arg Ala Arg Arg Arg Gln Val Ala Arg Leu Gly	
165 170 175	
ctg gcg gtc gcc ggg gcg ctg ctg gcc tcg gcg gcg agc ccg gtg gcg	576
Leu Ala Val Ala Gly Ala Leu Leu Ala Ser Ala Ala Ser Pro Val Ala	
180 185 190	
ggc ctc ttc gtc ggc ctg gcc ggc gcg gcg ctg ctg ctc acc cgc cgg	624
Gly Leu Phe Val Gly Leu Ala Gly Ala Ala Leu Leu Leu Thr Arg Arg	
195 200 205	
tac gcc gac ggc ctg gcg ctc ggc gtc gcc gcc gcg ctg ccg ctc ggg	672
Tyr Ala Asp Gly Leu Ala Leu Gly Val Ala Ala Ala Leu Pro Leu Gly	
210 215 220	
gcg acc gcg ctg ctc ttc ggc gac ggc ggc tgg atg aac atc agc cgc	720
Ala Thr Ala Leu Leu Phe Gly Asp Gly Gly Trp Met Asn Ile Ser Arg	
225 230 235 240	
acc gac acg ctg cgc gcc gtg ctg acc agc ctg ctg gtc gcc gcg ctg	768
Thr Asp Thr Leu Arg Ala Val Leu Thr Ser Leu Leu Val Ala Ala Leu	
245 250 255	
gtg gcg tac cgg ccg gtg cgg gtg ggc gcg ctg ctc tcg gcg gcc ggg	816
Val Ala Tyr Arg Pro Val Arg Val Gly Ala Leu Leu Ser Ala Ala Gly	
260 265 270	
gtg ctg gcg gcg gcg ctg gtg cac acc ccg gtc ggg ctg aac gcc acc	864
Val Leu Ala Ala Ala Leu Val His Thr Pro Val Gly Leu Asn Ala Thr	
275 280 285	
cgg ctg gcg gtc atg ttc ggc ctg ccg ctg ctg gcc gcc gcc gcc cgc	912
Arg Leu Ala Val Met Phe Gly Leu Pro Leu Leu Ala Ala Ala Ala Arg	
290 295 300	
ccc ccg gtc ggg ctg gcg cgg tgg tgg gcc cga cgc ggg cgg ggc gcg	960
Pro Pro Val Gly Leu Ala Arg Trp Trp Ala Arg Arg Gly Arg Gly Ala	
305 310 315 320	
gcg cgg ggc ggg gtg ggc ggc cgg gac gcg gcg cag ggg cgg agc aag	1008
Ala Arg Gly Gly Val Gly Gly Arg Asp Ala Ala Gln Gly Arg Ser Lys	
325 330 335	
gtc cgg ggc cgc gtg gcg ctg gcc acg ctg ctg gcg gcc ggc tgc tgg	1056
Val Arg Gly Arg Val Ala Leu Ala Thr Leu Leu Ala Ala Gly Cys Trp	
340 345 350	
tgg cag ccg ccg gtg ccc ccc gcc gac ctg cgc agc gtc gac gac ccg	1104
Trp Gln Pro Pro Val Pro Pro Ala Asp Leu Arg Ser Val Asp Asp Pro	
355 360 365	
acc ggc cgg gcc gcg tac ttg cgc cgc tgc ggg agt tcc tcg acg ggc	1152
Thr Gly Arg Ala Ala Tyr Leu Arg Arg Cys Gly Ser Ser Ser Thr Gly	
370 375 380	
agc ggc tca ccg gcc ggg tcg agg tgc cgc cga ccc gca act act ggg	1200

Ser Gly Ser Pro Ala Gly Ser Arg Cys Arg Arg Pro Ala Thr Thr Gly
 385 390 395 400

agg cgg cgc ggc tgg gcg agg tgc cgc tgg ccc ggg gct ggc tgc ggc 1248
 Arg Arg Arg Gly Trp Ala Arg Cys Arg Trp Pro Gly Ala Gly Cys Gly
 405 410 415

agg ccg aca tcg acc gga acc ccc tct tct tca cca ccg tcc cgg gcg 1296
 Arg Pro Thr Ser Thr Gly Thr Pro Ser Ser Ser Pro Pro Ser Arg Ala
 420 425 430

cgg ccg gca ccg ggg tgc cgc tga 1320
 Arg Pro Ala Pro Gly Cys Arg *

<210> 86
 <211> 439
 <212> PRT
 <213> Bacteria

<400> 86
 Val Gly Met Arg Arg Ser Arg Val Val Ala Val Ala Ala Ser Ala
 1 5 10 15
 Val Leu Leu Gly Val Thr Tyr Leu Ala Leu Pro Pro Thr Gly Ser Asp
 20 25 30
 Leu Ala Ala Gln Val Ala Arg Ala Asp Phe Phe Ala Ala His Gly Leu
 35 40 45
 Ala Pro Val Asp Leu Arg Trp Tyr Gly Gly Val Gln Gln Phe Gly Tyr
 50 55 60
 Ser Leu Val Ser Gln Pro Val Met Ala Leu Leu Gly Val Arg Val Thr
 65 70 75 80
 Gly Val Leu Ala Leu Val Ala Ala Ala Thr Ala Phe Ala Ala Leu Leu
 85 90 95
 Val Arg Thr Gly Val Pro Arg Pro Leu Leu Gly Ser Leu Val Gly Val
 100 105 110
 Val Thr Ile Ala Gly Asn Leu Val Ser Gly Arg Val Thr Tyr Gly Leu
 115 120 125
 Gly Val Ala Phe Gly Leu Gly Ala Leu Leu Ala Leu Thr Leu Pro Arg
 130 135 140
 Gly Pro Ala Ala Arg Ala Ala Asp Ser Asp Pro Ala Ala Pro Ala Asp
 145 150 155 160
 Ser Asp Ala Asp Gly Arg Ala Arg Arg Arg Gln Val Ala Arg Leu Gly
 165 170 175
 Leu Ala Val Ala Gly Ala Leu Leu Ala Ser Ala Ala Ser Pro Val Ala
 180 185 190
 Gly Leu Phe Val Gly Leu Ala Gly Ala Ala Leu Leu Leu Thr Arg Arg
 195 200 205
 Tyr Ala Asp Gly Leu Ala Leu Gly Val Ala Ala Ala Leu Pro Leu Gly
 210 215 220
 Ala Thr Ala Leu Leu Phe Gly Asp Gly Gly Trp Met Asn Ile Ser Arg
 225 230 235 240
 Thr Asp Thr Leu Arg Ala Val Leu Thr Ser Leu Leu Val Ala Ala Leu
 245 250 255
 Val Ala Tyr Arg Pro Val Arg Val Gly Ala Leu Leu Ser Ala Ala Gly
 260 265 270
 Val Leu Ala Ala Leu Val His Thr Pro Val Gly Leu Asn Ala Thr
 275 280 285

Arg Leu Ala Val Met Phe Gly Leu Pro Leu Leu Ala Ala Ala Arg
 290 295 300
 Pro Pro Val Gly Leu Ala Arg Trp Trp Ala Arg Gly Arg Gly Ala
 305 310 315 320
 Ala Arg Gly Gly Val Gly Gly Arg Asp Ala Ala Gln Gly Arg Ser Lys
 325 330 335
 Val Arg Gly Arg Val Ala Leu Ala Thr Leu Leu Ala Ala Gly Cys Trp
 340 345 350
 Trp Gln Pro Pro Val Pro Pro Ala Asp Leu Arg Ser Val Asp Asp Pro
 355 360 365
 Thr Gly Arg Ala Ala Tyr Leu Arg Arg Cys Gly Ser Ser Ser Thr Gly
 370 375 380
 Ser Gly Ser Pro Ala Gly Ser Arg Cys Arg Arg Pro Ala Thr Thr Gly
 385 390 395 400
 Arg Arg Arg Gly Trp Ala Arg Cys Arg Trp Pro Gly Ala Gly Cys Gly
 405 410 415
 Arg Pro Thr Ser Thr Gly Thr Pro Ser Ser Ser Pro Pro Ser Arg Ala
 420 425 430
 Arg Pro Ala Pro Gly Cys Arg
 435

<210> 87
 <211> 1431
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(1431)

<400> 87
 atg tcc ggc gtg cct cac cac ctc gcg cgc tgg atc ggc ctg gcc ggc 48
 Met Ser Gly Val Pro His His Leu Ala Arg Trp Ile Gly Leu Ala Gly
 1 5 10 15
 tcg acg ctg ctc gcc gtg gcc gcg ttc ctc ggc gga gcg ctg ccc gac 96
 Ser Thr Leu Leu Ala Val Ala Ala Phe Leu Gly Gly Ala Leu Pro Asp
 20 25 30
 ggc gat ttg cgc ccc acc ccg ctc agc atc tgg cag ggc ccg cac ggc 144
 Gly Asp Leu Arg Pro Thr Pro Leu Ser Ile Trp Gln Gly Pro His Gly
 35 40 45
 ccg ttg atc atc gcc acc tgg gcg gtc ggc acg ggc ctg atg gcg tac 192
 Pro Leu Ile Ile Ala Thr Trp Ala Val Gly Thr Gly Leu Met Ala Tyr
 50 55 60
 gcc tgg tgg gcg ctg cgc gac cgg gtg ccg tcg acc cgc tgg gcc gtg 240
 Ala Trp Trp Ala Leu Arg Asp Arg Val Pro Ser Thr Arg Trp Ala Val
 65 70 75 80
 gtc acc gcc ggg ctc tgg ctg ctg ccg ctg ctg gtc gcg ccg ccg ctg 288
 Val Thr Ala Gly Leu Trp Leu Leu Pro Leu Leu Val Ala Pro Pro Leu
 85 90 95
 ggc agc cga gac gtc tac gcg tac gcc tgc cag ggc gcc agc tac tcc 336
 Gly Ser Arg Asp Val Tyr Ala Tyr Ala Cys Gln Gly Ala Ser Tyr Ser

100	105	110	
gcc ggc atc aac ccg tac gag cag ggt gtc tcg gca ctg ccc tgc ccg Ala Gly Ile Asn Pro Tyr Glu Gln Gly Val Ser Ala Leu Pro Cys Pro 115 120 125			384
tgg ctg gac acc atc tcc tac atc tgg cgg gac acc tcg gcc ccg tac Trp Leu Asp Thr Ile Ser Tyr Ile Trp Arg Asp Thr Ser Ala Pro Tyr 130 135 140			432
ggg ccg ctg ttc ctg ctg atc gcc ggg gcg gtg gtc gag gcg acc ggg Gly Pro Leu Phe Leu Leu Ile Ala Gly Ala Val Val Glu Ala Thr Gly 145 150 155 160			480
tcg ctg acc ggc agc atc gtg ctg ttc cgg ctg ctg gcg gtg gcc ggg Ser Leu Thr Gly Ser Ile Val Leu Phe Arg Leu Leu Ala Val Ala Gly 165 170 175			528
gtg ggg ctg acc gcg gcc tgc ctg ccg ccg ctg gcc cgg cgc tgc ggc Val Gly Leu Thr Ala Ala Cys Leu Pro Pro Leu Ala Arg Arg Cys Gly 180 185 190			576
gtg ccg gcc ggc cgg gcg gtc tgg ctg gcg ctg ggc tcg ccg ctg atc Val Pro Ala Gly Arg Ala Val Trp Leu Ala Leu Gly Ser Pro Leu Ile 195 200 205			624
ggg gtg cac ctg atc tcg ggc gcg cac aac gac gcg ctg atg gtg ggg Gly Val His Leu Ile Ser Gly Ala His Asn Asp Ala Leu Met Val Gly 210 215 220			672
ctg ctc gtg gcc ggg ctg gcg atg gtg gtg gcc cgg ccg ggc cgc ccc Leu Leu Val Ala Gly Leu Ala Met Val Val Ala Arg Pro Gly Arg Pro 225 230 235 240			720
ggc ccg ctg ctc gcc ggg gga gcg ctg ctc ggc ctc gcc ggc gcc gtc Gly Pro Leu Leu Ala Gly Gly Ala Leu Leu Gly Leu Ala Gly Ala Val 245 250 255			768
aag gtc acc gcg ctg gtg gtg gtg ccg ttc gcg gcg ctc gcc gcg atc Lys Val Thr Ala Leu Val Val Val Pro Phe Ala Ala Leu Ala Ala Ile 260 265 270			816
gtc ggg gcg tac tcg atc agg gcg ttg atc cgc gac ggt ggg tgg gtg Val Gly Ala Tyr Ser Ile Arg Ala Leu Ile Arg Asp Gly Gly Trp Val 275 280 285			864
gtc ggc ggg gcg ctc gcg gcg gtc gtc ggc gcg acc ctc gcc agc ggc Val Gly Gly Ala Leu Ala Ala Val Val Gly Ala Thr Leu Ala Ser Gly 290 295 300			912
ctg ggc ttc ggc tgg gtc acc ggg ctg gag cag ggc ggc ctg gtg atc Leu Gly Phe Gly Trp Val Thr Gly Leu Glu Gln Gly Gly Leu Val Ile 305 310 315 320			960
gcc tgg acc tcg ccc ccg acg gcg gtg ggg cag acc gtc gcc tac ctc Ala Trp Thr Ser Pro Pro Thr Ala Val Gly Gln Thr Val Ala Tyr Leu 325 330 335			1008

gcc gcg ccg ttc ggc tgg cac ggc gat ccg ctg ccg gtc acc cgg ggc 1056
 Ala Ala Pro Phe Gly Trp His Gly Asp Pro Leu Pro Val Thr Arg Gly
 340 345 350

atc ggg atg gcc gtg ctc gcg ctg gtg ctg atc tgg ctg tgg tgg cgg 1104
 Ile Gly Met Ala Val Leu Ala Leu Val Leu Ile Trp Leu Trp Trp Arg
 355 360 365

gcc cgc acc cgg gag ccg ctg tgg cac gcc ggc ctg gcg ctg gcc gcc 1152
 Ala Arg Thr Arg Glu Pro Leu Trp His Ala Gly Leu Ala Leu Ala Ala
 370 375 380

acg gtc gcg ctc gcc ccg ctg ttc cac ccc tgg tac tgg acc tgg ccg 1200
 Thr Val Ala Leu Ala Pro Leu Phe His Pro Trp Tyr Trp Thr Trp Pro
 385 390 395 400

ctg gcc gtg ctc gcg gcc acg tcg cgg cgc acc ggc tgg ttc gcg ctc 1248
 Leu Ala Val Leu Ala Ala Thr Ser Arg Arg Thr Gly Trp Phe Ala Leu
 405 410 415

gtc gcg gtg ctc tcg gcg ttc ctg gtc ctc gcg gac ggc acc ggg ctg 1296
 Val Ala Val Leu Ser Ala Phe Leu Val Leu Ala Asp Gly Thr Gly Leu
 420 425 430

gcc cgg tac agc aag acg gtc ggc gcc ccg ctg atg acg ctg ttg gtg 1344
 Ala Arg Tyr Ser Lys Thr Val Gly Ala Pro Leu Met Thr Leu Leu Val
 435 440 445

atg gtg gtg gcc gtc cgc ttg gta cgg tcg gct tgg gcg gcc cgc cgg 1392
 Met Val Val Ala Val Arg Leu Val Arg Ser Ala Trp Ala Ala Arg Arg
 450 455 460

tcg gct cgg gcg gcc cgc cgg ccg gcc gcc gtg aac tga 1431
 Ser Ala Arg Ala Ala Arg Arg Pro Ala Ala Val Asn *
 465 470 475

<210> 88
 <211> 476
 <212> PRT
 <213> Bacteria

<400> 88
 Met Ser Gly Val Pro His His Leu Ala Arg Trp Ile Gly Leu Ala Gly
 1 5 10 15
 Ser Thr Leu Leu Ala Val Ala Ala Phe Leu Gly Gly Ala Leu Pro Asp
 20 25 30
 Gly Asp Leu Arg Pro Thr Pro Leu Ser Ile Trp Gln Gly Pro His Gly
 35 40 45
 Pro Leu Ile Ile Ala Thr Trp Ala Val Gly Thr Gly Leu Met Ala Tyr
 50 55 60
 Ala Trp Trp Ala Leu Arg Asp Arg Val Pro Ser Thr Arg Trp Ala Val
 65 70 75 80
 Val Thr Ala Gly Leu Trp Leu Leu Pro Leu Leu Val Ala Pro Pro Leu
 85 90 95
 Gly Ser Arg Asp Val Tyr Ala Tyr Ala Cys Gln Gly Ala Ser Tyr Ser
 100 105 110
 Ala Gly Ile Asn Pro Tyr Glu Gln Gly Val Ser Ala Leu Pro Cys Pro

115	120	125
Trp Leu Asp Thr Ile Ser Tyr Ile Trp Arg Asp Thr Ser Ala Pro Tyr		
130	135	140
Gly Pro Leu Phe Leu Leu Ile Ala Gly Ala Val Val Glu Ala Thr Gly		
145	150	155
Ser Leu Thr Gly Ser Ile Val Leu Phe Arg Leu Leu Ala Val Ala Gly		
165	170	175
Val Gly Leu Thr Ala Ala Cys Leu Pro Leu Ala Arg Arg Cys Gly		
180	185	190
Val Pro Ala Gly Arg Ala Val Trp Leu Ala Leu Gly Ser Pro Leu Ile		
195	200	205
Gly Val His Leu Ile Ser Gly Ala His Asn Asp Ala Leu Met Val Gly		
210	215	220
Leu Leu Val Ala Gly Leu Ala Met Val Val Ala Arg Pro Gly Arg Pro		
225	230	235
Gly Pro Leu Leu Ala Gly Gly Ala Leu Leu Gly Leu Ala Gly Ala Val		
245	250	255
Lys Val Thr Ala Leu Val Val Val Pro Phe Ala Ala Leu Ala Ala Ile		
260	265	270
Val Gly Ala Tyr Ser Ile Arg Ala Leu Ile Arg Asp Gly Gly Trp Val		
275	280	285
Val Gly Gly Ala Leu Ala Ala Val Val Gly Ala Thr Leu Ala Ser Gly		
290	295	300
Leu Gly Phe Gly Trp Val Thr Gly Leu Glu Gln Gly Gly Leu Val Ile		
305	310	315
Ala Trp Thr Ser Pro Pro Thr Ala Val Gly Gln Thr Val Ala Tyr Leu		
325	330	335
Ala Ala Pro Phe Gly Trp His Gly Asp Pro Leu Pro Val Thr Arg Gly		
340	345	350
Ile Gly Met Ala Val Leu Ala Leu Val Leu Ile Trp Leu Trp Trp Arg		
355	360	365
Ala Arg Thr Arg Glu Pro Leu Trp His Ala Gly Leu Ala Leu Ala Ala		
370	375	380
Thr Val Ala Leu Ala Pro Leu Phe His Pro Trp Tyr Trp Thr Trp Pro		
385	390	395
Leu Ala Val Leu Ala Ala Thr Ser Arg Arg Thr Gly Trp Phe Ala Leu		
405	410	415
Val Ala Val Leu Ser Ala Phe Leu Val Leu Ala Asp Gly Thr Gly Leu		
420	425	430
Ala Arg Tyr Ser Lys Thr Val Gly Ala Pro Leu Met Thr Leu Leu Val		
435	440	445
Met Val Val Ala Val Arg Leu Val Arg Ser Ala Trp Ala Ala Arg Arg		
450	455	460
Ser Ala Arg Ala Ala Arg Arg Pro Ala Ala Val Asn		
465	470	475

<210> 89
 <211> 1509
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(1509)

<400> 89
 gtg acc aca ccc ggc tcc ccg tcg acc tcg ccc gac gtc tcg ccg tcg 48

Val	Thr	Thr	Pro	Gly	Ser	Pro	Ser	Thr	Ser	Pro	Asp	Val	Ser	Pro	Ser		
1				5					10					15			
ccg	gat	gcc	gcc	cgg	ctc	gcc	cgg	tac	gcg	ggc	ctg	ggc	ggg	gcg	gtg	96	
Pro	Asp	Ala	Ala	Arg	Leu	Ala	Arg	Tyr	Ala	Gly	Leu	Gly	Gly	Ala	Val		
			20					25					30				
ctg	ttg	gcc	gtc	gcc	ggc	tgg	cgg	ggc	ggg	gcg	ctg	ccg	tcg	acc	ccg	144	
Leu	Leu	Ala	Val	Ala	Gly	Trp	Arg	Gly	Gly	Ala	Leu	Pro	Ser	Thr	Pro		
			35				40					45					
ctg	gac	gtc	ccc	ccg	ggg	gac	cgt	tgg	ctg	tcg	gac	ggt	ggg	ccg	ctg	192	
Leu	Asp	Val	Pro	Pro	Gly	Asp	Arg	Trp	Leu	Ser	Asp	Gly	Gly	Pro	Leu		
	50					55					60						
acg	ctg	ggg	gtc	tgg	ctg	gtc	ggc	acg	gcc	ctg	ctg	gtc	ggc	gcc	tgg	240	
Thr	Leu	Gly	Val	Trp	Leu	Val	Gly	Thr	Ala	Leu	Leu	Val	Gly	Ala	Trp		
	65				70				75						80		
tgg	gcg	ctg	cgc	cgg	ggc	gcg	ccg	tcc	acg	cgg	tgg	gcg	tac	ctg	acc	288	
Trp	Ala	Leu	Arg	Arg	Gly	Ala	Pro	Ser	Thr	Arg	Trp	Ala	Tyr	Leu	Thr		
				85				90						95			
gcc	ggg	ctg	tgg	gcg	ctg	ccg	ctg	ctg	gtc	acc	ccg	ccg	ctg	ggc	agc	336	
Ala	Gly	Leu	Trp	Ala	Leu	Pro	Leu	Leu	Val	Thr	Pro	Pro	Leu	Gly	Ser		
			100					105					110				
cgg	gac	gtc	tac	tcc	tac	gcc	tgc	cag	ggc	tgg	gcg	tac	gcg	cac	ggc	384	
Arg	Asp	Val	Tyr	Ser	Tyr	Ala	Cys	Gln	Gly	Trp	Ala	Tyr	Ala	His	Gly		
		115					120					125					
gtc	gac	ccg	tac	gcg	acc	ggg	gtg	gcc	gag	gcc	ggc	tgc	ccc	tgg	gtg	432	
Val	Asp	Pro	Tyr	Ala	Thr	Gly	Val	Ala	Glu	Ala	Gly	Cys	Pro	Trp	Val		
	130					135					140						
gag	tcg	gtc	gcg	ccg	atc	tgg	cgg	gac	acg	ccc	gcc	ccg	tac	ggg	ccg	480	
Glu	Ser	Val	Ala	Pro	Ile	Trp	Arg	Asp	Thr	Pro	Ala	Pro	Tyr	Gly	Pro		
	145				150				155						160		
ttc	ttc	gtg	ctg	ctc	gcc	gcg	ctc	gcg	gtg	acc	ctc	ggc	ggc	ggc	ctg	528	
Phe	Phe	Val	Leu	Leu	Ala	Ala	Leu	Ala	Val	Thr	Leu	Gly	Gly	Gly	Leu		
				165				170						175			
gtg	ggc	gct	gtc	gtg	gcg	ttc	cgc	ctg	ctc	gcg	gtc	gcc	ggg	gtg	ttg	576	
Val	Gly	Ala	Val	Val	Ala	Phe	Arg	Leu	Leu	Ala	Val	Ala	Gly	Val	Leu		
			180				185						190				
ctg	gcc	gcc	ctc	tgc	ctg	gtg	ggc	ctg	gcc	cgc	gcc	gcg	ggc	gtg	ccc	624	
Leu	Ala	Ala	Leu	Cys	Leu	Val	Gly	Leu	Ala	Arg	Ala	Ala	Gly	Val	Pro		
			195				200					205					
acc	cgc	agg	gcg	gcc	tgg	ctg	gcg	ctg	gcc	tgc	ccg	ctg	gtc	ggg	gtc	672	
Thr	Arg	Arg	Ala	Ala	Trp	Leu	Ala	Leu	Ala	Cys	Pro	Leu	Val	Gly	Val		
	210					215				220							
cac	ctg	gtg	gcc	ggc	gcg	cac	aac	gac	gcg	gtg	atg	ctc	ggc	ctg	ctg	720	
His	Leu	Val	Ala	Gly	Ala	His	Asn	Asp	Ala	Val	Met	Leu	Gly	Leu	Leu		
	225				230				235						240		

ctg ctg ggc ctg ctg gtg ctg gtg cgc ggg ccc ggc aag ccg aag ccg	768
Leu Leu Gly Leu Leu Val Leu Val Arg Gly Pro Gly Lys Pro Lys Pro	
245 250 255	
ctg ttg gtg gcc ggg gcc ctg ctc ggg ctg gcg gtg acg gtg aag gcc	816
Leu Leu Val Ala Gly Ala Leu Leu Gly Leu Ala Val Thr Val Lys Ala	
260 265 270	
acc gcc gtg gtg gtg ctt ccc ttc gcg gcg ctg gcc gcg gtg ctg ggc	864
Thr Ala Val Val Val Leu Pro Phe Ala Ala Leu Ala Ala Val Leu Gly	
275 280 285	
cgc tac acc gtg cgg gcg ctg ctg cgc gac gcc ggc tgg ctg gcc ggc	912
Arg Tyr Thr Val Arg Ala Leu Leu Arg Asp Ala Gly Trp Leu Ala Gly	
290 295 300	
ggg acg ctc ggc gcg gtg ggg gtc acc tcg ctg ctg tcc ggc ctc gga	960
Gly Thr Leu Gly Ala Val Gly Val Thr Ser Leu Leu Ser Gly Leu Gly	
305 310 315 320	
ctc gcc tgg ata cgc ggg ctg acc cgc agc ggg gac tcc gag cag tgg	1008
Leu Gly Trp Ile Arg Gly Leu Thr Arg Ser Gly Asp Ser Glu Gln Trp	
325 330 335	
acg tcg ccc ccg acg gcg gtg ggc ttc gtc gtc gac tac gcg ggc gag	1056
Thr Ser Pro Pro Thr Ala Val Gly Phe Val Val Asp Tyr Ala Gly Glu	
340 345 350	
ctc gcc ggg cgg gac ccg ggc gcg gtg ccg gcg acc cgc gcg gcg gcg	1104
Leu Ala Gly Arg Asp Pro Gly Ala Val Pro Ala Thr Arg Ala Ala Ala	
355 360 365	
ctg ctg ctg ctc gcc gtg ctc gtg gcg gcg ctg tgg tgg cgg gcc tgg	1152
Leu Leu Leu Leu Ala Val Leu Val Ala Ala Leu Trp Trp Arg Ala Trp	
370 375 380	
tcg ggg ctg cgc cgg ctg aac gac gtc cgg cag cgg gtg gcc cgc ctg	1200
Ser Gly Leu Arg Arg Leu Asn Asp Val Arg Gln Arg Val Ala Arg Leu	
385 390 395 400	
gac gcc gcc cgc ccc cgg gtg acc ctg ctc ggc gcg ggg ctg gcg ctg	1248
Asp Ala Ala Arg Pro Arg Val Thr Leu Leu Gly Ala Gly Leu Ala Leu	
405 410 415	
gcc gcc acg gtc ctc ctc gcc ccg gtc ttc cac ccc tgg tac gcc acc	1296
Ala Ala Thr Val Leu Leu Ala Pro Val Phe His Pro Trp Tyr Ala Thr	
420 425 430	
tgg ccg ctg gcc ctg ctc gcg gtc gcc gcg acg cgg acc acc tgg ttc	1344
Trp Pro Leu Ala Leu Leu Ala Val Ala Ala Thr Arg Thr Thr Trp Phe	
435 440 445	
gtg gcg ccc tgc gcg gcg gcg gcc ttc ctc acc ctg ccc gac ggc acc	1392
Val Ala Pro Cys Ala Ala Ala Ala Phe Leu Thr Leu Pro Asp Gly Thr	
450 455 460	
aac ctg gcc cgg ttc acc aag gcc ccg ggc gcg atc gcg atg acc gcg	1440

Asn Leu Ala Arg Phe Thr Lys Ala Pro Gly Ala Ile Ala Met Thr Ala
465 470 475 480

ctg gtg gcc ggg ctg gcg gtg tgg ggc ctg ctc cgg ctg cgc cgg acc 1488
Leu Val Ala Gly Leu Ala Val Trp Gly Leu Leu Arg Leu Arg Arg Thr
485 490 495

cgt gcc gcg cgc ccc ggc tga 1509
Arg Ala Ala Arg Pro Gly *
500

<210> 90
<211> 502
<212> PRT
<213> Bacteria

<400> 90
Val Thr Thr Pro Gly Ser Pro Ser Thr Ser Pro Asp Val Ser Pro Ser
1 5 10 15
Pro Asp Ala Ala Arg Leu Ala Arg Tyr Ala Gly Leu Gly Gly Ala Val
20 25 30
Leu Leu Ala Val Ala Gly Trp Arg Gly Gly Ala Leu Pro Ser Thr Pro
35 40 45
Leu Asp Val Pro Pro Gly Asp Arg Trp Leu Ser Asp Gly Gly Pro Leu
50 55 60
Thr Leu Gly Val Trp Leu Val Gly Thr Ala Leu Leu Val Gly Ala Trp
65 70 75 80
Trp Ala Leu Arg Arg Gly Ala Pro Ser Thr Arg Trp Ala Tyr Leu Thr
85 90 95
Ala Gly Leu Trp Ala Leu Pro Leu Leu Val Thr Pro Pro Leu Gly Ser
100 105 110
Arg Asp Val Tyr Ser Tyr Ala Cys Gln Gly Trp Ala Tyr Ala His Gly
115 120 125
Val Asp Pro Tyr Ala Thr Gly Val Ala Glu Ala Gly Cys Pro Trp Val
130 135 140
Glu Ser Val Ala Pro Ile Trp Arg Asp Thr Pro Ala Pro Tyr Gly Pro
145 150 155 160
Phe Phe Val Leu Leu Ala Ala Leu Ala Val Thr Leu Gly Gly Gly Leu
165 170 175
Val Gly Ala Val Val Ala Phe Arg Leu Leu Ala Val Ala Gly Val Leu
180 185 190
Leu Ala Ala Leu Cys Leu Val Gly Leu Ala Arg Ala Ala Gly Val Pro
195 200 205
Thr Arg Arg Ala Ala Trp Leu Ala Leu Ala Cys Pro Leu Val Gly Val
210 215 220
His Leu Val Ala Gly Ala His Asn Asp Ala Val Met Leu Gly Leu Leu
225 230 235 240
Leu Leu Gly Leu Leu Val Leu Val Arg Gly Pro Gly Lys Pro Lys Pro
245 250 255
Leu Leu Val Ala Gly Ala Leu Leu Gly Leu Ala Val Thr Val Lys Ala
260 265 270
Thr Ala Val Val Val Leu Pro Phe Ala Ala Leu Ala Ala Val Leu Gly
275 280 285
Arg Tyr Thr Val Arg Ala Leu Arg Asp Ala Gly Trp Leu Ala Gly
290 295 300
Gly Thr Leu Gly Ala Val Gly Val Thr Ser Leu Leu Ser Gly Leu Gly
305 310 315 320

85										90					95					
gcc	ggg	ttc	acc	ccg	ccg	gcc	ggc	gcg	gcg	tgg	cag	cgg	ctc	atc	ccg	336				
Ala	Gly	Phe	Thr	Pro	Pro	Ala	Gly	Ala	Ala	Trp	Gln	Arg	Leu	Ile	Pro					
			100						105					110						
ccg	gac	cgg	gag	gaa	ctc	gtc	tgc	cac	aac	gac	gtg	gcc	ccg	tgg	aac	384				
Pro	Asp	Arg	Glu	Glu	Leu	Val	Cys	His	Asn	Asp	Val	Ala	Pro	Trp	Asn					
		115					120					125								
ctg	atc	agg	gcg	gac	cgg	ggc	tgg	gtg	ctg	atc	gac	tgg	gac	tgc	gcg	432				
Leu	Ile	Arg	Ala	Asp	Arg	Gly	Trp	Val	Leu	Ile	Asp	Trp	Asp	Cys	Ala					
	130					135					140									
gcg	ccg	ggc	tcc	cgg	ctc	tgg	gac	ctc	gcg	tac	gcc	gcg	cag	agc	atg	480				
Ala	Pro	Gly	Ser	Arg	Leu	Trp	Asp	Leu	Ala	Tyr	Ala	Ala	Gln	Ser	Met					
145					150					155					160					
gcc	ggc	ctg	cgc	ccg	gac	cgg	ccg	gtg	gcc	gag	tgc	gcg	gcc	cgg	ctg	528				
Ala	Gly	Leu	Arg	Pro	Asp	Arg	Pro	Val	Ala	Glu	Ser	Ala	Ala	Arg	Leu					
				165					170					175						
cgc	gcc	ttc	gcc	gac	ggc	tac	cgg	ctg	gac	gag	gcg	tcc	cgc	ccg	gcc	576				
Arg	Ala	Phe	Ala	Asp	Gly	Tyr	Arg	Leu	Asp	Glu	Ala	Ser	Arg	Pro	Ala					
			180					185					190							
ctg	gcc	gcc	atg	ctg	ggc	cgc	cgc	gcc	cgg	gcc	atg	tac	gac	ctg	ttg	624				
Leu	Ala	Ala	Met	Leu	Gly	Arg	Arg	Ala	Arg	Ala	Met	Tyr	Asp	Leu	Leu					
		195				200						205								
cgc	gag	ggc	gcg	gaa	cag	cgg	cgc	gag	ccg	tgg	gcc	cgg	atc	tgg	acc	672				
Arg	Glu	Gly	Ala	Glu	Gln	Arg	Arg	Glu	Pro	Trp	Ala	Arg	Ile	Trp	Thr					
	210					215					220									
gag	gac	ggc	ccg	tac	tgg	ctg	gcc	acc	gcc	gaa	cac	ctc	gac	gcc	cac	720				
Glu	Asp	Gly	Pro	Tyr	Trp	Leu	Ala	Thr	Ala	Glu	His	Leu	Asp	Ala	His					
225					230					235					240					
acc	gag	gca	tgg	gag	atc	gcc	ctg	cgc	tga							750				
Thr	Glu	Ala	Trp	Glu	Ile	Ala	Leu	Arg	*											
				245																

<210> 92
 <211> 249
 <212> PRT
 <213> Bacteria

<400> 92
 Met Ser Thr Ala Glu Glu Ser Leu Pro Gly Asn Ala Thr Thr Gly Val
 1 5 10 15
 Val Arg Val Gly Asp Thr Val Arg Arg Pro Val Gly Pro Trp Ser Asp
 20 25 30
 Val Val Asp Ala Leu Leu Glu His Leu His Ala Val Gly Phe Ala Gly
 35 40 45
 Ala Pro Arg Pro Leu Gly Arg Asp Ala Gln Gly Arg Gln Val Leu Glu
 50 55 60
 Tyr Val Pro Gly Glu Val Gly Glu Ala Ser Gly Thr Tyr Pro Val Ala

65		70		75		80									
Asp	Leu	Phe	Ala	Ile	Gly	Arg	Met	Leu	Ala	Glu	Leu	His	Glu	Ala	Leu
			85						90					95	
Ala	Gly	Phe	Thr	Pro	Pro	Ala	Gly	Ala	Ala	Trp	Gln	Arg	Leu	Ile	Pro
			100					105					110		
Pro	Asp	Arg	Glu	Glu	Leu	Val	Cys	His	Asn	Asp	Val	Ala	Pro	Trp	Asn
		115					120					125			
Leu	Ile	Arg	Ala	Asp	Arg	Gly	Trp	Val	Leu	Ile	Asp	Trp	Asp	Cys	Ala
	130					135					140				
Ala	Pro	Gly	Ser	Arg	Leu	Trp	Asp	Leu	Ala	Tyr	Ala	Ala	Gln	Ser	Met
145					150					155					160
Ala	Gly	Leu	Arg	Pro	Asp	Arg	Pro	Val	Ala	Glu	Ser	Ala	Ala	Arg	Leu
			165						170					175	
Arg	Ala	Phe	Ala	Asp	Gly	Tyr	Arg	Leu	Asp	Glu	Ala	Ser	Arg	Pro	Ala
		180						185					190		
Leu	Ala	Ala	Met	Leu	Gly	Arg	Arg	Ala	Arg	Ala	Met	Tyr	Asp	Leu	Leu
	195					200					205				
Arg	Glu	Gly	Ala	Glu	Gln	Arg	Arg	Glu	Pro	Trp	Ala	Arg	Ile	Trp	Thr
	210					215					220				
Glu	Asp	Gly	Pro	Tyr	Trp	Leu	Ala	Thr	Ala	Glu	His	Leu	Asp	Ala	His
225					230					235				240	
Thr	Glu	Ala	Trp	Glu	Ile	Ala	Leu	Arg							
			245												

<210> 93
 <211> 1315
 <212> DNA
 <213> Bacteria

<400> 93
 catcctccct cgcctaaagg cgggggagtc cgaccctcgc gggttgggggt tcctggttca 60
 ccgcagaccg cacggaagga ggtccttcgt gtctgacgtc cgctccgcag gcgttttttcg 120
 tctcggccag cccggccgcg acggtgatgt tcttggctgc gttgacgtcc cggatcatgcc 180
 ggggtgccga actcggacac gtccagtggc gtgtgccgag ggagagtgtg gcgagcaggt 240
 gccgcacgc cgagcaggtc ttcgacgacg ggtaccagcg gtccaccacc gcgaggggtgc 300
 ggccgtcgcg gtgcgccttg taggtgagca ggggtgcgga ctcggcccag ccggtacgcg 360
 agatcgcttt ggccaggag tggttgcgga ccattgttcgc cacggccagg tcctccacgg 420
 cgatggcggc gaaccggcgc accaggcggt tggactgctg gtggaggaaag tcccggcggg 480
 cgtcgcgcac ctgcgaatgc gtcggggcga ccattcgttt ggctttggcg cggttggcgg 540
 agcccttctg tcggcgggcc attatccgct gataccgctt gagtcggcgt tcccgcggtt 600
 ccattgtgctt cgggtggggg atgcgttcgc cgggtggacag caccgcgaag tcggtcaggc 660
 cgaggtccac gccaccgcc tcgccggtgg gttcgggtgc ggcgggtgtg tcgacgtcga 720
 cggcgaaggt cacgaaccag cggccgtccg ggtcacgcga caccgtcacc atcgtcggat 780
 ccaacccgcg cggatccacg ttcggcaacg accacacgaa ccgcagcacc ccgggtgtct 840
 ttcccaacga caggttcccg ctgcggaggc ggaacgccga ccgggtgtaa ctggcggaact 900
 ggcggccgtg tcgggacttg tagcgcggt accgggcccg cttggcgaag aaggcggtca 960
 tggcggtgtg ctggtgccgc aggggtctgct gcaacggcac cgacgacacc tcaccagat 1020
 acgccaggtc gggctgcttc ttcattctccg tcaacgcccg atcggctctc gcgtaggagg 1080
 tggatctccg ttcgggtgtg cagcgggctg gacggggcgc gagcgtgcgcg ttccagacga 1140
 cacgtacaca cccgaacgtg cggttcagca ccgccgcctg ctccgggggtc ggggtacgcc 1200
 gacacctgta cgcgtccgc acaggaccag ccctaccaga aaggacagtc gtggctgaca 1260
 acgcatccgc cgttcgtccc cgccctgaag gacgtggcat cctggcggtg atccg 1315

<210> 94
 <211> 1263
 <212> DNA
 <213> Bacteria

<220>
 <221> CDS
 <222> (1)...(1263)

<400> 94

gtg cta gat atg act caa gta gac ggg tgc ccc ctg cca act ctg gaa	48
Val Leu Asp Met Thr Gln Val Asp Gly Ser Pro Leu Pro Thr Leu Glu	
1 5 10 15	
agg caa gtg atc acc gtg cgt gtg ctg ttc gcc agt ctc gga acc cat	96
Arg Gln Val Ile Thr Val Arg Val Leu Phe Ala Ser Leu Gly Thr His	
20 25 30	
ggc cac acc tac ccc ctg ctg cca ctg gcc acg gcc gcc cgt gcg gcg	144
Gly His Thr Tyr Pro Leu Leu Pro Leu Ala Thr Ala Ala Arg Ala Ala	
35 40 45	
ggc cac gag gtc acc ttc gcc acc ggc gag ggc ttc gcg ggc acc ctg	192
Gly His Glu Val Thr Phe Ala Thr Gly Glu Gly Phe Ala Gly Thr Leu	
50 55 60	
cgg aag ctg ggc ttc gag ccg gtc gcg acc ggg atg ccg gtc ttc gac	240
Arg Lys Leu Gly Phe Glu Pro Val Ala Thr Gly Met Pro Val Phe Asp	
65 70 75 80	
ggg ttc ctg gcg gcg ctg cgg atc cgc ttc gac acc gac agc ccc gag	288
Gly Phe Leu Ala Ala Leu Arg Ile Arg Phe Asp Thr Asp Ser Pro Glu	
85 90 95	
ggg ctg acc ccc gag cag ctc agt gag ctg ccg cag atc gtg ttc ggg	336
Gly Leu Thr Pro Glu Gln Leu Ser Glu Leu Pro Gln Ile Val Phe Gly	
100 105 110	
cgg gtc atc ccg cag cgc gtc ttc gac gag ctc cag ccg gtg atc gaa	384
Arg Val Ile Pro Gln Arg Val Phe Asp Glu Leu Gln Pro Val Ile Glu	
115 120 125	
cgg ttg cga ccc gac ctc gtg gtg cag gag atc agc aac tac ggc gcc	432
Arg Leu Arg Pro Asp Leu Val Val Gln Glu Ile Ser Asn Tyr Gly Ala	
130 135 140	
ggc ctg gcc gcc ctg aag gcg ggc atc ccg acc atc tgc cac ggg gtc	480
Gly Leu Ala Ala Leu Lys Ala Gly Ile Pro Thr Ile Cys His Gly Val	
145 150 155 160	
ggc cgg gac acg ccg gac gac ctg acc cgg tcc atc gag gag gag gtg	528
Gly Arg Asp Thr Pro Asp Asp Leu Thr Arg Ser Ile Glu Glu Glu Val	
165 170 175	
cgg ggg ctg gcc cag cgg ctc ggc ctc gac ctg ccg ccc ggg cgc atc	576
Arg Gly Leu Ala Gln Arg Leu Gly Leu Asp Leu Pro Pro Gly Arg Ile	
180 185 190	
gac ggc ttc ggc aac ccc ttc atc gac atc ttc ccg ccg tgc ctg cag	624
Asp Gly Phe Gly Asn Pro Phe Ile Asp Ile Phe Pro Pro Ser Leu Gln	
195 200 205	
gag ccg gag ttc cgg gcc cgc ccg cgg cgc cac gag ctg cgc ccg gtg	672

Glu	Pro	Glu	Phe	Arg	Ala	Arg	Pro	Arg	Arg	His	Glu	Leu	Arg	Pro	Val		
210							215				220						
ccc	ttc	gcc	gag	cag	ggt	gac	ctc	ccg	gcc	tgg	ctg	tcc	tcg	cgc	gac	720	
Pro	Phe	Ala	Glu	Gln	Gly	Asp	Leu	Pro	Ala	Trp	Leu	Ser	Ser	Arg	Asp		
225					230				235					240			
acg	gcc	cgc	ccg	ctg	gtc	tac	ctg	acg	ctc	ggc	acg	tcc	agc	ggc	ggc	768	
Thr	Ala	Arg	Pro	Leu	Val	Tyr	Leu	Thr	Leu	Gly	Thr	Ser	Ser	Gly	Gly		
				245					250					255			
acc	gtc	gag	gtg	ctg	cgg	gcg	gcg	atc	gac	ggg	ctc	gcc	ggc	ctc	gac	816	
Thr	Val	Glu	Val	Leu	Arg	Ala	Ala	Ile	Asp	Gly	Leu	Ala	Gly	Leu	Asp		
			260					265					270				
gcc	gac	gtc	ctg	gtc	gcc	agc	ggc	ccg	tcc	ctc	gac	gtc	agc	gga	ctg	864	
Ala	Asp	Val	Leu	Val	Ala	Ser	Gly	Pro	Ser	Leu	Asp	Val	Ser	Gly	Leu		
		275					280					285					
ggc	gag	gtg	ccg	gca	aac	gta	cgg	ctc	gag	tcg	tgg	gtg	ccg	cag	gcg	912	
Gly	Glu	Val	Pro	Ala	Asn	Val	Arg	Leu	Glu	Ser	Trp	Val	Pro	Gln	Ala		
	290				295						300						
gcc	ctg	ctg	ccc	cac	gtc	gac	ctg	gtg	gtg	cac	cac	ggg	ggc	agc	ggc	960	
Ala	Leu	Leu	Pro	His	Val	Asp	Leu	Val	Val	His	His	Gly	Gly	Ser	Gly		
305					310					315					320		
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Arg	Lys	Leu	Gly	Phe	Glu	Pro	Val	Ala	Thr	Gly	Met	Pro	Val	Phe	Asp
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Gly	Phe	Leu	Ala	Ala	Leu	Arg	Ile	Arg	Phe	Asp	Thr	Asp	Ser	Pro	Glu
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Thr	Ala	Arg	Pro	Leu	Val	Tyr	Leu	Thr	Leu	Gly	Thr	Ser	Ser	Gly	Gly
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